NASA/SP—2002-7039/SUPPL61
July 2002

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Introduction

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography* is a semiannual NASA publication containing comprehensive abstracts of NASA owned inventions covered by U.S. patents. The citations included in the bibliography arrangement of citations were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

The citations published in this issue cover the period December 2001 through July 2002. This issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in ascending order.

A typical citation and abstract presents the various data elements included in most records cited. This appears after the table of contents.

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Table of Contents

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

12 Astronautics (General) N.A.

For extraterrestrial exploration, see *91 Lunar and Planetary Exploration*.

13 Astrodynamics N.A.

Includes powered and free-flight trajectories; and orbital and launching dynamics.

14 Ground Support Systems and Facilities (Space) N.A.

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators. *For related information, see also 09 Research and Support Facilities (Air)*.

15 Launch Vehicles and Space Vehicles N.A.

Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. For related information, see also *20 Spacecraft Propulsion and Power*.

16 Space Transportation N.A.

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. For related information, see also *03 Air Transportation and Safety* and *18 Spacecraft Design, Testing and Performance*. For space suits, see *54 Man/System Technology and Life Support*.

17 Space Communications, Spacecraft Communications, Command and Tracking N.A.

Includes telemetry; space communication networks; astronavigation and guidance; and radio blackout. For related information, see also *04 Aircraft Communications and Navigation* and *32 Communications and Radar*.

18 Spacecraft Design, Testing and Performance 3

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. For life support systems, see *54 Man/System Technology and Life Support*. For related information, see also *05 Aircraft Design, Testing and Performance*, *39 Structural Mechanics, and 16 Space Transportation*.

19 Spacecraft Instrumentation N.A.

For related information, see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 Spacecraft Propulsion and Power 4

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information, see also *07 Aircraft Propulsion and Power*, *28 Propellants and Fuels*, *44 Energy Production and Conversion*, and *15 Launch Vehicles and Space Vehicles*.

76 Solid-State Physics N.A.

Includes superconductivity. For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

77 Thermodynamics and Statistical Physics N.A.

Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics. For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

80 Social Sciences (General) N.A.

Includes educational matters.

81 Administration and Management N.A.

Includes management planning and research.

82 Documentation and Information Science N.A.

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer documentation see *61 Computer Programming and Software*.

83 Economics and Cost Analysis N.A.

Includes cost effectiveness studies.

84 Law, Political Science and Space Policy N.A.

Includes NASA appropriation hearings; aviation law; space law and policy; international law; international cooperation; and patent policy.

85 Urban Technology and Transportation N.A.

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation. For related information see *03 Air Transportation and Safety, 16 Space Transportation*, and *44 Energy Production and Conversion*.

88 Space Sciences (General) N.A.

89 Astronomy N.A.

Includes radio, gamma-ray, and infrared astronomy; and astrometry.

90 Astrophysics N.A.

Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust. For related information see also *75 Plasma Physics*.

Indexes

Two indexes are available. You may use the **Find** command under the **Tools** menu while viewing the PDF file for direct match searching on any text string. You may also view the indexes provided, for searching on *NASA Thesaurus* subject terms and author names.

Selecting an index above will link you to that comprehensive listing.

Typical Report Citation and Abstract

❶ **19970011223** NASA Langley Research Center, Hampton, VA USA

❷ **Serrated-Planform Lifting-Surfaces**

❸ McGrath, Brian E., Inventor, NASA Langley Research Center, USA; Wood, Richard M., Inventor, NASA Langley Research

❹ Center, USA; Oct. 22, 1996; 38p; In English

❺ Patent Info.: Filed 22 Oct. 1996; NASA-Case-LAR-15295-1; US-Patent-Appl-SN-734820

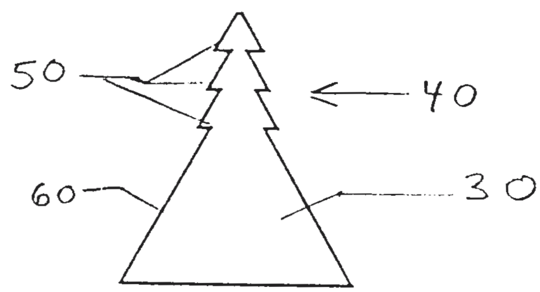
❻ Report No.(s): NAS 1.71:LAR-15295-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

❼ A set of serrated-planform lifting surfaces is provided which produces unexpectedly high lift coefficients at moderate to high angles-of-attack. Each serration, or tooth, is designed to shed a vortex. The interaction of the vortices greatly enhances the lifting capability over an extremely large operating range. Variations of the invention use serrated-planform lifting surfaces in planes different than that of a primary lifting surface. In an alternate embodiment, the individual teeth are controllably retractable and deployable to provide for active control of the vortex system and hence lift coefficient. Differential lift on multiple serrated-planform lifting surfaces provides an means for vehicle control. The important aerodynamic advantages of the serrated-planform lifting surfaces are not limited to aircraft applications but can be used to establish desirable performance characteristics for missiles, land vehicles, and/or watercraft.

❽ NASA

❾ *Angle of Attack; Lift; Vortex Shedding; Active Control; Lifting Bodies*

❿



Key

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NASA PATENT ABSTRACTS BIBLIOGRAPHY

A Continuing Bibliography (Suppl. 61)

JULY 2002

02
AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information see also 34 Fluid Mechanics and Heat Transfer.

20020005126 NASA Langley Research Center, Hampton, VA USA

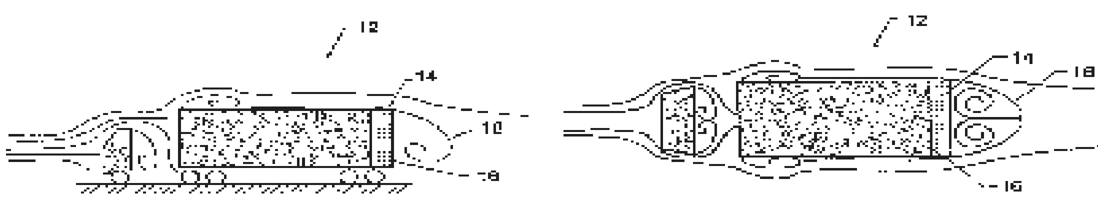
Base Passive Porosity for Drag Reduction

Bauer, Steven X. S., Inventor, NASA Langley Research Center, USA; Wood, Richard M., Inventor, NASA Langley Research Center, USA; Sep. 11, 2001; 8p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-327061, Filed 19 Oct. 1994
Patent Info.: Filed 1 Nov. 1996; NASA-Case-LAR-15601-1; US-Patent-6,286,892; US-Patent-Appl-SN-744414; US-Patent-Appl-SN-327061; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A device for controlling drag on a ground vehicle. The device consists of a porous skin mounted on the trailing surface of the ground vehicle. The porous skin may be separated from the vehicle surface by a distance of at least the thickness of the porous skin. Alternately, the trailing surface of the ground vehicle may be porous. The device minimizes the strength of the separation in the base and wake regions of the ground vehicle, thus reducing drag.

Official Gazette of the U.S. Patent and Trademark Office

Aerodynamic Drag; Drag Reduction; Porosity



05
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology. For related information see also 18 Spacecraft Design, Testing and Performance and 39 Structural Mechanics. For land transportation vehicles see 85 Urban Technology and Transportation.

20020060118 NASA Dryden Flight Research Center, Edwards, CA USA

Helicopter Tail Boom With Venting for Alleviation and Control of Tail Boom Aerodynamic Loads and Method Thereof

Banks, Daniel W., Inventor, NASA Dryden Flight Research Center, USA; Kelley, Henry L., Inventor, NASA Dryden Flight Research Center, USA; Mar. 05, 2002; 14p; In English
Patent Info.: Filed 2 Jun. 2000; NASA-Case-DRC-098096; US-Patent-6,352,220; US-Patent-Appl-SN-586603; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In at least one embodiment, the apparatus of the invention is a flight vehicle tail assembly having an exterior surface, at least one first vent in the exterior surface, at least one second vent in the exterior surface, and an air passage connecting the at least one first vent to the at least one second vent allowing air to flow there between. Where the at least one first vent is located near a high air pressure area acting on the exterior surface during a range of predefined flight conditions, Further, the at least one second vent

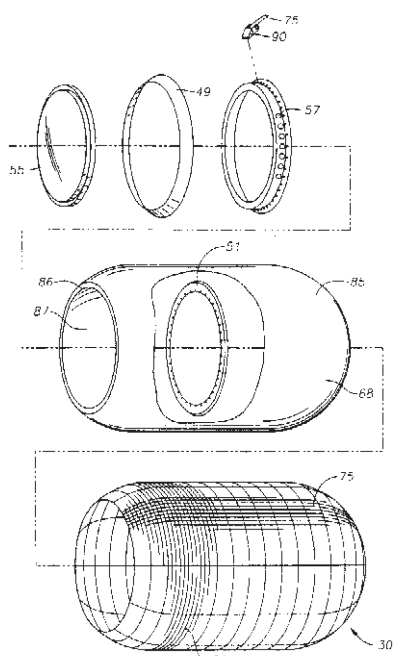
is located near a low air pressure area acting on the exterior surface during the predefined flight conditions. So that at the predefined flight conditions adverse loads on the tail assembly are reduced by venting air from the high pressure area, through the tail assembly, to the low pressure area. The method of the present invention includes the steps of: receiving air through the at least one first vent in the exterior surface, passing the air through the tail assembly from the at least one first vent to at least one second vent in the exterior surface. and ejecting the air out of the tail assembly at the at least one second vent.
Official Gazette of the U.S. Patent and Trademark Office
Tail Assemblies; Helicopter Control; Aerodynamic Loads; Venting; Vents

09
RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information see also 14 Ground Support Systems and Facilities (Space).

20020038548 NASA Johnson Space Center, Houston, TX USA
Portable Hyperbaric Chamber
Schneider, William C., Inventor, NASA Johnson Space Center, USA; Locke, James P., Inventor, NASA Johnson Space Center, USA; DeLaFuente, Horacio, Inventor, NASA Johnson Space Center, USA; Nov. 27, 2001; 16p; In English
Patent Info.: Filed 17 May 2000; NASA-Case-MSC-23076-1; US-Patent-6,321,746; US-Patent-Appl-SN-574758; No Copyright ; Avail: CASI; A03, Hardcopy; A01, Microfiche

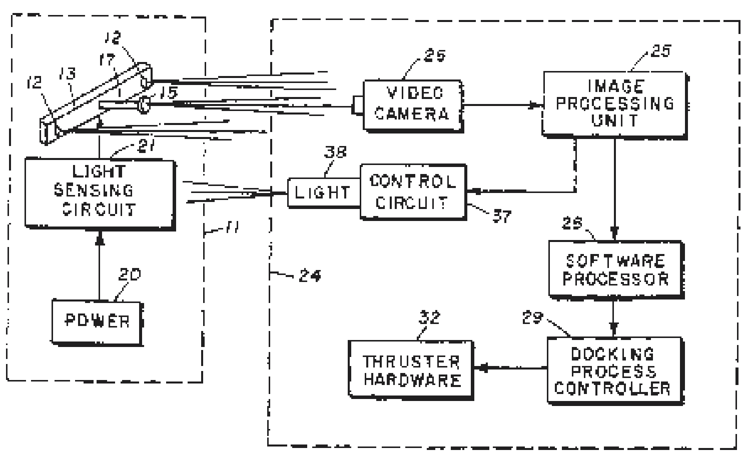
A portable, collapsible hyperbaric chamber was developed. A toroidal inflatable skeleton provides initial structural support for the chamber, allowing the attendant and/or patient to enter the chamber. Oval hatches mate against bulkhead rings, and the hyperbaric chamber is pressurized. The hatches seal against an o-ring, and the internal pressure of the chamber provides the required pressure against the hatch to maintain an airtight seal. In the preferred embodiment, the hyperbaric chamber has an airlock to allow the attendant to enter and exit the patient chamber during treatment. Visual communication is provided through portholes in the patient and/or airlock chamber. Life monitoring and support systems are in communication with the interior of the hyperbaric chamber and/or airlock chamber through conduits and/or sealed feed-through connectors into the hyperbaric chamber.
Official Gazette of the U.S. Patent and Trademark Office
Hyperbaric Chambers; Design Analysis; Support Systems



Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. For life support systems see 54 Man/System Technology and Life Support. For related information see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.

20020010895 NASA Marshall Space Flight Center, Huntsville, AL USA
Synchronized Docking System
Howard, Richard T., Inventor, NASA Marshall Space Flight Center, USA; Book, Michael L., Inventor, NASA Marshall Space Flight Center, USA; Bryan, Thomas C., Inventor, NASA Marshall Space Flight Center, USA; Jul. 03, 2001; 4p; In English
Patent Info.: Filed 10 Dec. 1998; NASA-Case-MFS-31278-1; US-Patent-6,254,035; US-Patent-Appl-SN-228071; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

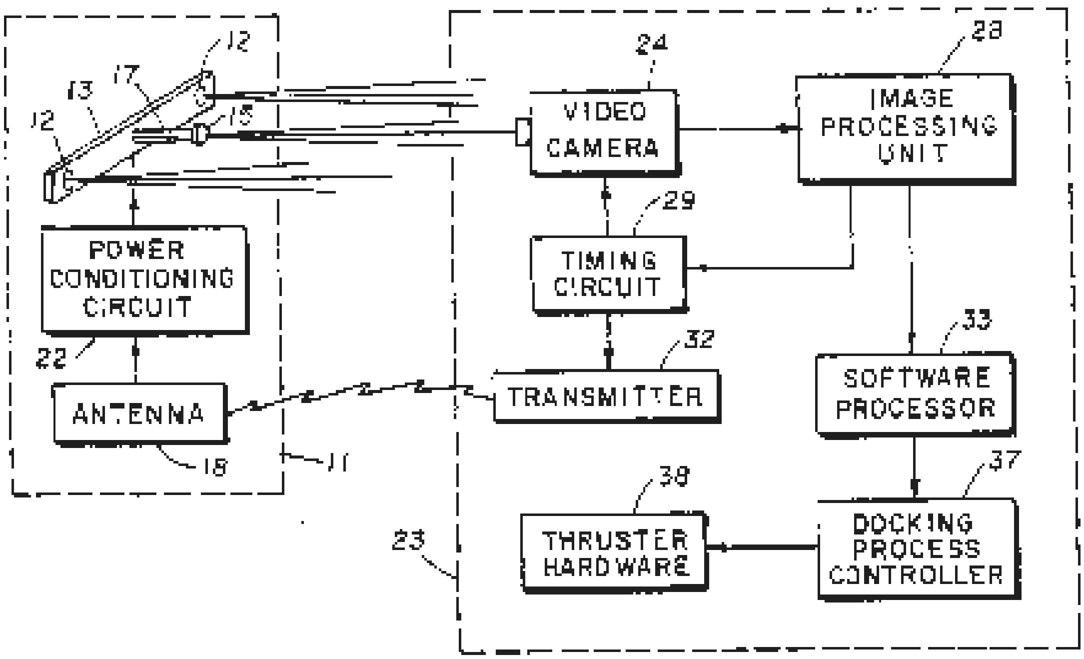
A synchronized target subsystem for use in an automated docking system for docking a chase vehicle with a target vehicle wherein the chase vehicle is provided with a video camera for feeding digitized frames to an image processing unit which feeds signals to a control circuit. The control circuit turns on the video camera to digitize a background frame which will include the target vehicle. After the camera grabs the background frame the control circuit turns on a light, which is carried by carried on the chase vehicle and aimed at the target vehicle, and signals the video camera to digitize a foreground frame. A light sensing circuit on the target vehicle receives the light from the chase vehicle and connects a power supply to lights on the target vehicle such that when the foreground frame is digitized the Lights on the target vehicle will show in the foreground frame. Die image processing unit subtracts the background frame from the foreground frame and provides a docking signal.
Official Gazette of the U.S. Patent and Trademark Office
Image Processing; Spacecraft Docking; Detection



20020010903 NASA Marshall Space Flight Center, Huntsville, AL USA
Synchronized Autonomous Docking System
Howard, Richard T., Inventor, NASA Marshall Space Flight Center, USA; Book, Michael L., Inventor, NASA Marshall Space Flight Center, USA; Bryan, Thomas C., Inventor, NASA Marshall Space Flight Center, USA; May 08, 2001; 4p; In English
Patent Info.: Filed 10 Dec. 1998; NASA-Case-MFS-31279-1; US-Patent-6,227,495; US-Patent-Appl-SN-228033; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A synchronized target subsystem for use in an automated docking system for docking a chase vehicle with a target vehicle wherein the chase vehicle is provided with a video camera for feeding digitized frames to an image processing unit which controls a timing circuit. ’Me timing circuit turns on the video camera to digitize a foreground frame and at the same time turns on a transmitter on the chase vehicle. A power generating antenna on the target vehicle receives the transmitted signal from the

transmitter and actuates lights on the chase vehicle so that these lights appear in the foreground frame. After the foreground frame has been grabbed, the timing circuit turns the transmitter off and signals the video camera to digitize a background frame. The image processing unit subtracts the background frame from the foreground frame and provides a docking signal.
Official Gazette of the U.S. Patent and Trademark Office
Autonomy; Image Processing; Spacecraft Docking; Cameras



20
SPACECRAFT PROPULSION AND POWER

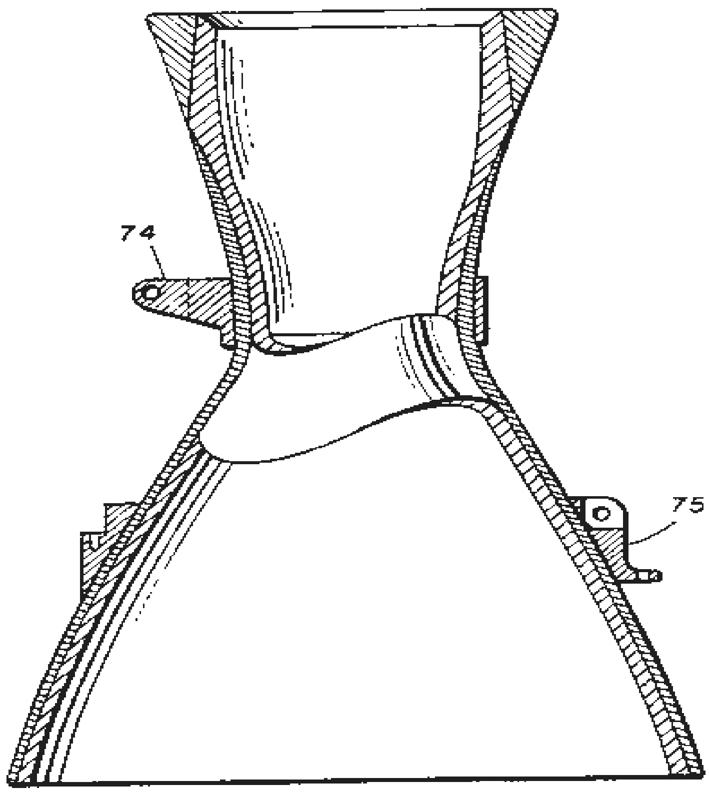
Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.

20020005117 NASA Marshall Space Flight Center, Huntsville, AL USA
Rocket Engine Thrust Chamber Assembly
Cornelius, Charles S., Inventor, NASA Marshall Space Flight Center, USA; Counts, Richard H., Inventor, NASA Marshall Space Flight Center, USA; Myers, W. Neill, Inventor, NASA Marshall Space Flight Center, USA; Lackey, Jeffrey D., Inventor, NASA Marshall Space Flight Center, USA; Peters, Warren, Inventor, NASA Marshall Space Flight Center, USA; Shadoan, Michael, Inventor, NASA Marshall Space Flight Center, USA; Sparks, David L., Inventor, NASA Marshall Space Flight Center, USA; Lawrence, Timothy W., Inventor, NASA Marshall Space Flight Center, USA; Mar. 06, 2001; 8p; In English
Patent Info.: Filed 10 Dec. 1998; NASA-Case-MFS-31138-1; US-Patent-6,195,984; US-Patent-Appl-SN-228034; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A thrust chamber assembly for liquid fueled rocket engines and the method of making it wherein a two-piece mandrel having the configuration of an assembly having a combustion chamber portion connected to a nozzle portion through a throat portion is wrapped with a silica tape saturated with a phenolic resin, the tape extending along the mandrel and covering the combustion chamber portion of the mandrel to the throat portion. The width of the tape is positioned at an angle of 30 to 50 deg. to the axis of the mandrel such that one edge of the tape contacts the mandrel while the other edge is spaced from the mandrel. The phenolic in the tape is cured and the end of the wrap is machined to provide a frusto-conical surface extending at an angle of 15 to 30 deg. with respect to the axis of the mandrel for starting a second wrap on the mandrel to cover the throat portion. The remainder of the mandrel is wrapped with a third silica tape having its width positioned at a angle of 5 to 20 deg. from the axis of the mandrel. The resin in the third tape is cured and the assembly is machined to provide a smooth outer surface. The entire assembly is then wrapped with a tow of graphite fibers wetted with an epoxy resin and, after the epoxy resin is cured, the graphite is machined to final dimensions.

Official Gazette of the U.S. Patent and Trademark Office

Combustion Chambers; Epoxy Resins; Graphite; Rocket Engines; Thrust Chambers



20020005123 NASA Marshall Space Flight Center, Huntsville, AL USA

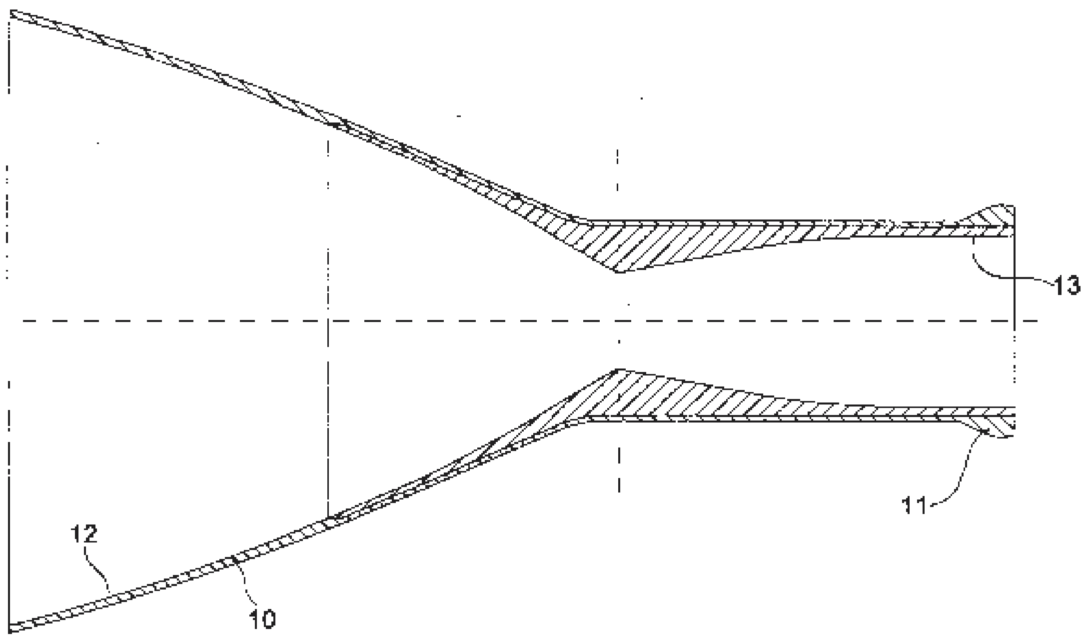
Combustion Chamber/Nozzle Assembly and Fabrication Process Therefor

Myers, W. Neill, Inventor, NASA Marshall Space Flight Center, USA; Cornelius, Charles S., Inventor, NASA Marshall Space Flight Center, USA; Dec. 26, 2000; 6p; In English; Provisional of US-Patent-Appl-SN-057004, filed 18 Aug. 1997

Patent Info.: Filed 14 Aug. 1998; US-Patent-6,164,060; US-Patent-Appl-SN-134703; US-Patent-Appl-SN-057004; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An integral lightweight combustion chamber/nozzle assembly for a rocket engine has a refractory metal shell defining a chamber of generally frusto-conical contour. The shell communicates at its larger end with a rocket body, and terminates at its

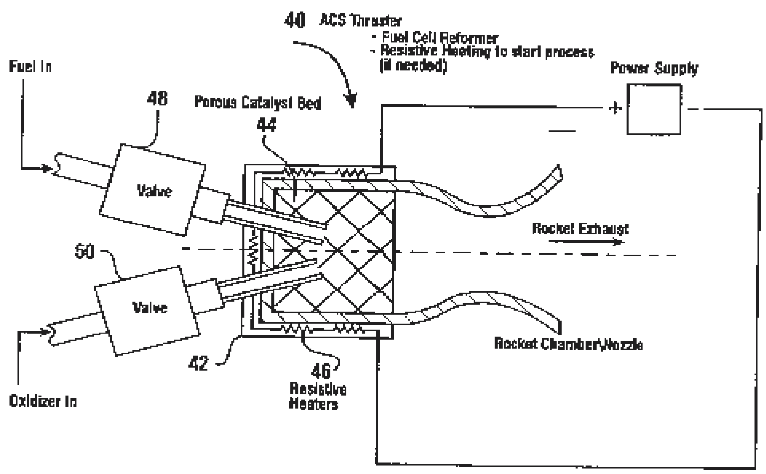
smaller end in a tube of generally cylindrical contour, which is open at its terminus and which serves as a nozzle for the rocket engine. The entire inner surface of the refractory metal shell has a thermal and oxidation barrier layer applied thereto. An ablative silica phenolic insert is bonded to the exposed surface of the thermal and oxidation barrier layer. The ablative phenolic insert provides a chosen inner contour for the combustion chamber and has a taper toward the open terminus of the nozzle. A process for fabricating the integral, lightweight combustion chamber/nozzle assembly is simple and efficient, and results in economy in respect of both resources and time.
Official Gazette of the U.S. Patent and Trademark Office
Combustion Chambers; Fabrication; Nozzle Design; Metal Shells



20020005130 NASA Glenn Research Center, Cleveland, OH USA
Reduced Toxicity Fuel Satellite Propulsion System Including Fuel Cell Reformer with Alcohols Such as Methanol
Schneider, Steven J., Inventor, NASA Glenn Research Center, USA; Nov. 13, 2001; 30p; In English
Patent Info.: Filed 17 Apr. 2001; NASA-Case-LEW-16636-3; US-Patent-6,314,718; US-Patent- Appl-SN-837819; US-Patent-Appl-SN-291883; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

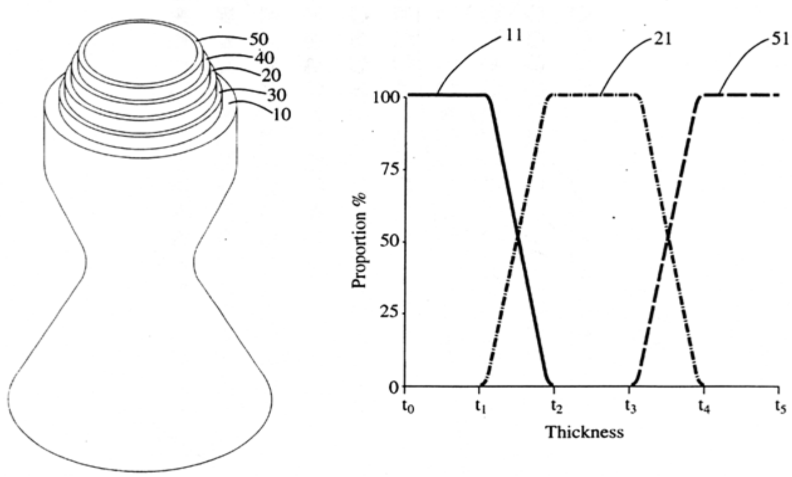
A reduced toxicity fuel satellite propulsion system including a reduced toxicity propellant supply for consumption in an axial class thruster and an ACS class thruster. The system includes suitable valves and conduits for supplying the reduced toxicity propellant to the ACS decomposing element of an ACS thruster. The ACS decomposing element is operative to decompose the reduced toxicity propellant into hot propulsive gases. In addition the system includes suitable valves and conduits for supplying the reduced toxicity propellant to an axial decomposing element of the axial thruster. The axial decomposing element is operative to decompose the reduced toxicity propellant into hot gases. The system further includes suitable valves and conduits for supplying

a second propellant to a combustion chamber of the axial thruster, whereby the hot gases and the second propellant auto-ignite and begin the combustion process for producing thrust.
Official Gazette of the U.S. Patent and Trademark Office
Fuel Systems; Propellant Consumption; Propellants; Toxicity; Spacecraft Propulsion



20020034152 NASA Marshall Space Flight Center, Huntsville, AL USA
Rocket Combustion Chamber Coating
Holmes, Richard R., Inventor, NASA Marshall Space Flight Center, USA; McKechnie, Timothy N., Inventor, NASA Marshall Space Flight Center, USA; Nov. 13, 2001; 10p; In English
Patent Info.: Filed 19 Jan. 2000; NASA-Case-MFS-31438-1; US-Patent-6,314,720; US-Patent-Appl-SN-490290; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A coating with the ability to protect (1) the inside wall (i.e., lining) of a rocket engine combustion chamber and (2) parts of other apparatuses that utilize or are exposed to combustive or high temperature environments. The novelty of this invention lies in the manner a protective coating is embedded into the lining.
Official Gazette of the U.S. Patent and Trademark Office
Combustion Chambers; Protective Coatings; Rocket Engines



20020034153 NASA Marshall Space Flight Center, Huntsville, AL USA

Rocket Engine Thrust Chamber Assembly

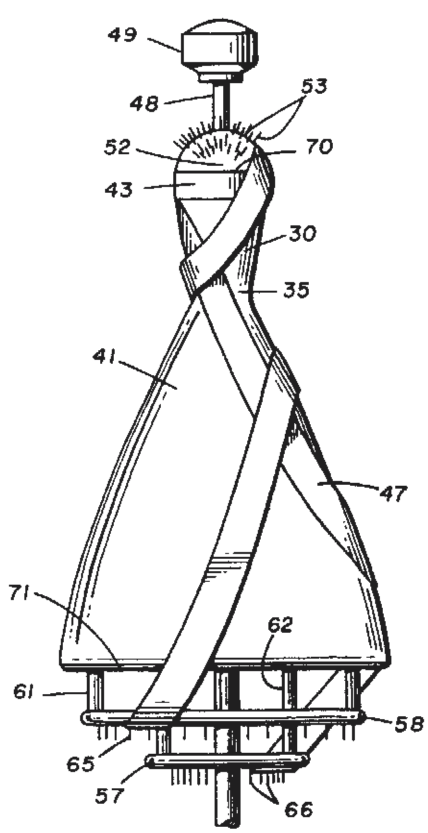
Cornelius, Charles S., Inventor, NASA Marshall Space Flight Center, USA; Counts, Richard H., Inventor, NASA Marshall Space Flight Center, USA; Myers, W. Neill, Inventor, NASA Marshall Space Flight Center, USA; Lackey, Jeffrey D., Inventor, NASA Marshall Space Flight Center, USA; Peters, Warren, Inventor, NASA Marshall Space Flight Center, USA; Shadoan, Michael D., Inventor, NASA Marshall Space Flight Center, USA; Sparks, David L., Inventor, NASA Marshall Space Flight Center, USA; Lawrence, Timothy W., Inventor, NASA Marshall Space Flight Center, USA; Dec. 18, 2001; 8p; In English; Division of US-Patent-Appl-SN-228034, filed 10 Dec. 1998

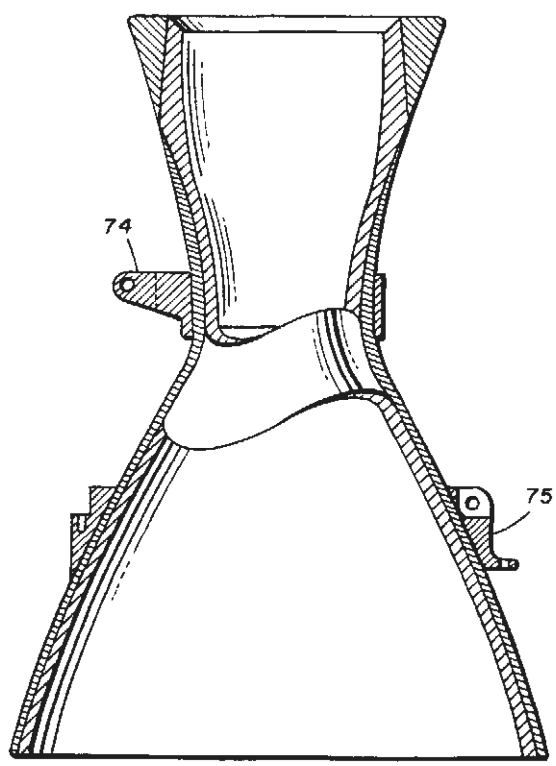
Patent Info.: Filed 22 Dec. 2000; NASA-Case-MFS-31138-2-Div; US-Patent-6,330,792; US-Patent-Appl-SN-747979; US-Patent-Appl-SN-228034; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A thrust chamber assembly for liquid fueled rocket engines and the method of making it wherein a two-piece mandrel wrapped with a silica tape saturated with a phenolic resin, the tape extending along the mandrel and covering the combustion chamber portion of the mandrel to the throat portion. The phenolic in the tape is cured and the end of the wrap is machined. The remainder of the mandrel is wrapped with a third silica tape. The resin in the third tape is cured and the assembly is machined. The entire assembly is then wrapped with a tow of graphite fibers wetted with an epoxy resin and, after the epoxy resin is cured, the graphite is machined to final dimensions.

Official Gazette of the U.S. Patent and Trademark Office

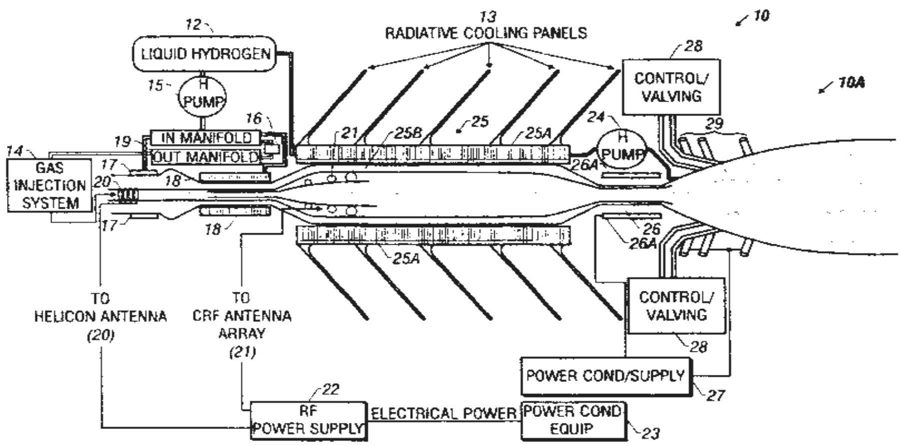
Liquid Propellant Rocket Engines; Thrust Chambers

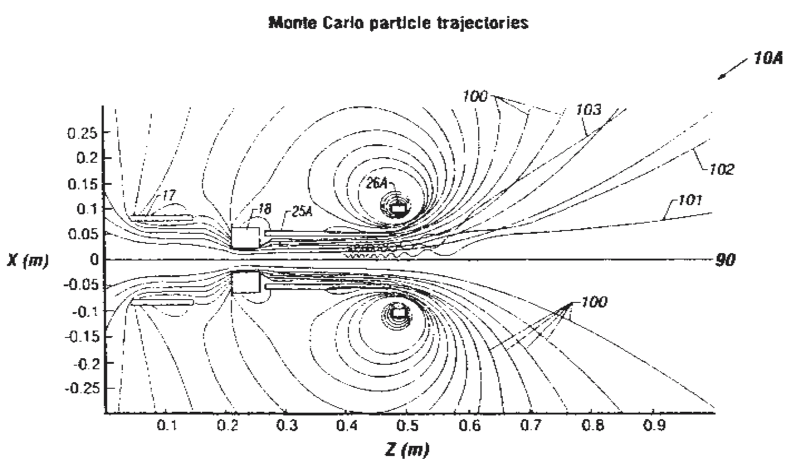




20020038753 NASA Johnson Space Center, Houston, TX USA
Variable Specific Impulse Magnetoplasma Rocket Engine
Chang-Diaz, Franklin R., Inventor, NASA Johnson Space Center, USA; Jan. 01, 2002; 10p; In English
Patent Info.: Filed 28 Jun. 1999; NASA-Case-MSC-23041-1; US-Patent-6,334,302; US-Patent-Appl-SN-351152; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An engine is disclosed, including a controllable output plasma generator, a controllable heater for selectably raising a temperature of the plasma connected to an outlet of the plasma generator, and a nozzle connected to an outlet of the heater, through which heated plasma is discharged to provide thrust. In one embodiment, the source of plasma is a helicon generator. In one embodiment, the heater is an ion cyclotron resonator. In one embodiment, the nozzle is a radially diverging magnetic field disposed on a discharge side of the heater so that helically travelling particles in the beater exit the heater at high axial velocity. A particular embodiment includes control circuits for selectably directing a portion of radio frequency power from an RF generator to the helicon generator and to the cyclotron resonator so that the thrust output and the specific impulse of the engine can be selectively controlled. A method of propelling a vehicle is also disclosed. The method includes generating a plasma, heating said plasma, and discharging the heated plasma through a nozzle. In one embodiment, the nozzle is a diverging magnetic field. In this embodiment, the heating is performed by applying a radio frequency electro magnetic field to the plasma at the ion cyclotron frequency in an axially polarized DC magnetic field.
Official Gazette of the U.S. Patent and Trademark Office
Plasma Generators; Plasma Heating; Vasimr (Propulsion System); Plasma Propulsion; Rocket Nozzles





20020060123 NASA Marshall Space Flight Center, Huntsville, AL USA

Atomic-Based Combined Cycle Propulsion System and Method

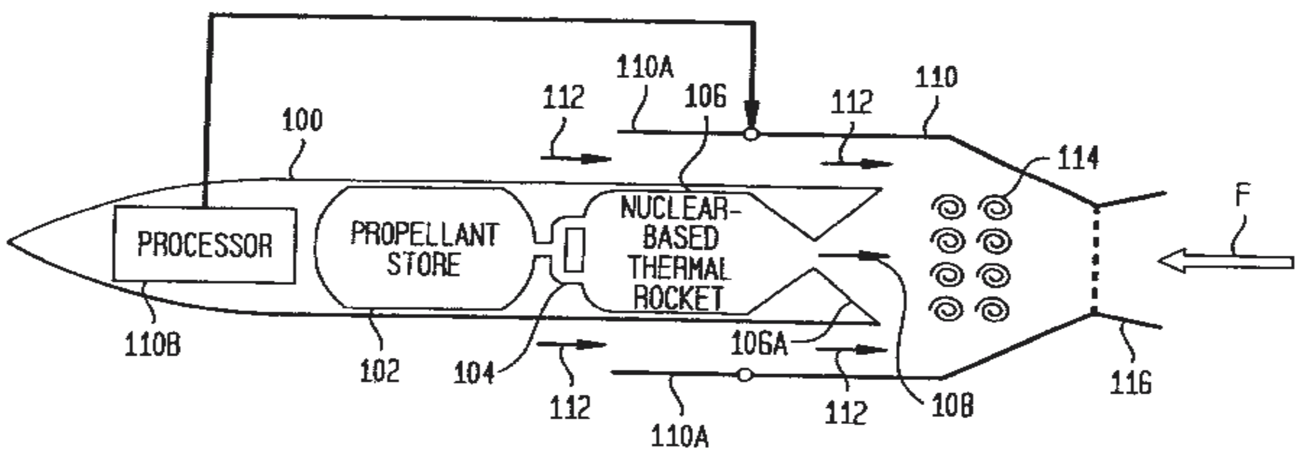
Schmidt, George R., Inventor, NASA Marshall Space Flight Center, USA; Apr. 09, 2002; 6p; In English

Patent Info.: Filed 10 Apr. 2000; NASA-Case-MFS-31341; US-Patent-6,367,243; US-Patent-Appl-SN-546030; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A method and system are provided for propelling an aerodynamic vehicle into space. The aerodynamic vehicle uses a nuclear-based thermal rocket (NTR) propulsion system capable of producing a hydrogen exhaust. A flow of air is introduced into the hydrogen exhaust to augment the thrust force at speeds of the vehicle up to approximately Mach 6. When the speed of the vehicle is approximately Mach 6 and the altitude of the vehicle is approximately 40 kilometers, the flow of air is stopped and the vehicle is propelled into space using only the NTR.

Official Gazette of the U.S. Patent and Trademark Office

Nuclear Propulsion; Spacecraft Launching; Rocket Thrust; Rocket Exhaust



23
CHEMISTRY AND MATERIALS (GENERAL)

20020038549 NASA Langley Research Center, Hampton, VA USA

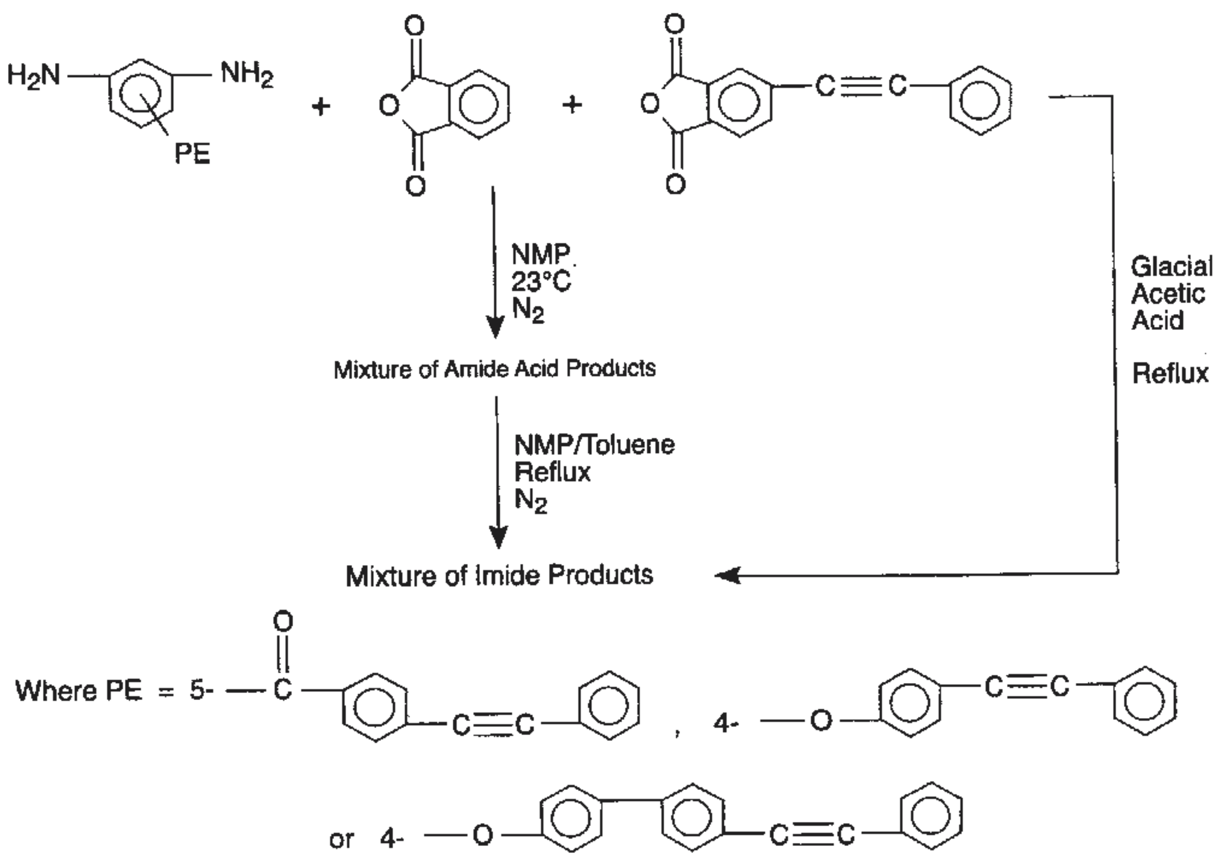
Phenylethynyl Containing Reactive Additives

Connell, John W., Inventor, NASA Langley Research Center, USA; Smith, Joseph G., Jr., Inventor, NASA Langley Research Center, USA; Hergenrother, Paul M., Inventor, NASA Langley Research Center, USA; Feb. 26, 2002; 16p; In English

Patent Info.: Filed 13 Apr. 1999; NASA-Case-LAR-15543-1; US-Patent-6,350,817; US-Patent-Appl-SN-290295; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

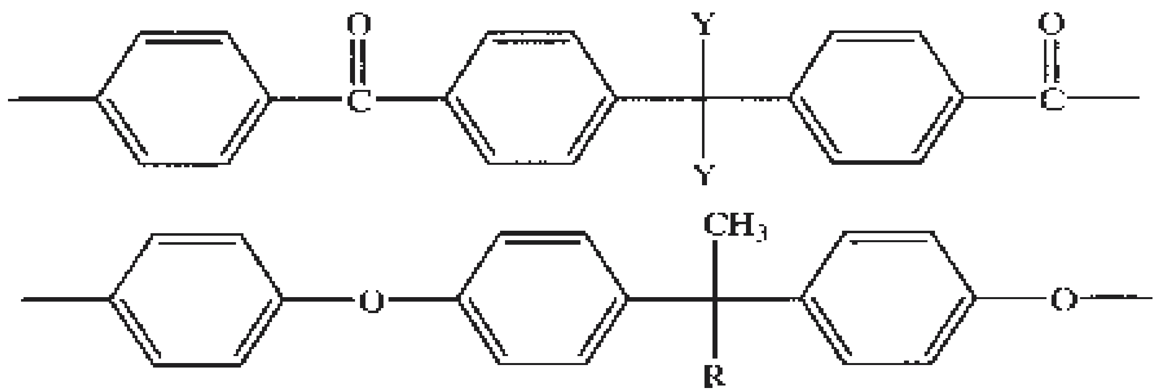
Phenylethynyl containing reactive additives were prepared from aromatic diamines containing phenylethynyl groups and various ratios of phthalic anhydride and 4-phenylethynylphthalic anhydride in glacial acetic acid to form the imide in one step or in N-methyl-2-pyrrolidi none to form the amide acid intermediate. The reactive additives were mixed in various amounts (10% to 90%) with oligomers containing either terminal or pendent phenylethynyl groups (or both) to reduce the melt viscosity and thereby enhance processability. Upon thermal cure, the additives react and become chemically incorporated into the matrix and effect an increase in crosslink density relative to that of the host resin. This resultant increase in crosslink density has advantageous

consequences on the cured resin properties such as higher glass transition temperature and higher modulus as compared to that of the host resin.
Official Gazette of the U.S. Patent and Trademark Office
Additives; Reactivity; Resins; Diamines



20020060120 NASA Langley Research Center, Hampton, VA USA
Poly (Aryl Ether Ketones) Bearing Alkylated Side Chains
Cassidy, Patrick E., Inventor, NASA Langley Research Center, USA; Fitch, John W., III, Inventor, NASA Langley Research Center, USA; Gronewald, Scott D., Inventor, NASA Langley Research Center, USA; St.Clair, Ann K., Inventor, NASA Langley Research Center, USA; Stoakley, Diane M., Inventor, NASA Langley Research Center, USA; Apr. 16, 2002; 6p; In English; Provisional US-Patent-Appl-SN-136926, filed 1 Jun. 1999
Patent Info.: Filed 1 Jun. 1999; NASA-Case-LAR-15962-1; US-Patent-6,372,877; US-Patent-Appl-SN-585456; US- Patent-Appl-SN-136926; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This invention relates generally to poly(aryl ether ketones) bearing alkylated side chains. It relates particularly to soluble, thermally stable. low dielectric poly(aryl ether ketones) with alkylated side chains and especially to films and coatings thereof. These poly(aryl ether ketones) have a structural formula wherein Y is selected from the group consisting of CF3 and CH3; and wherein R is C(sub n)H(sub (2n+1)) and n = 11-18.
Official Gazette of the U.S. Patent and Trademark Office
Aromatic Compounds; Ethers; Ketones; Molecular Chains



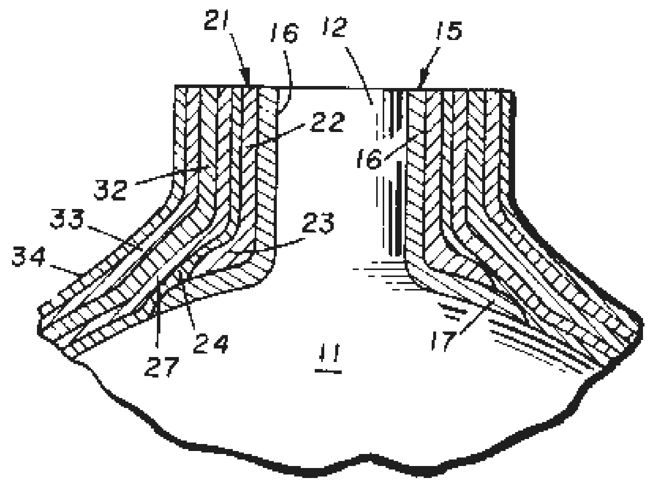
24
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see 27 Nonmetallic Materials.

20020005118 NASA Marshall Space Flight Center, Huntsville, AL USA
Method of Making a Composite Tank
DeLay, Thomas K., Inventor, NASA Marshall Space Flight Center, USA; Feb. 27, 2001; 3p; In English; Division of US-Patent-Appl-SN-218652, filed 22 Dec. 1998
Patent Info.: Filed 19 Jun. 2000; NASA-Case-MFS-31379-2-DIV; US-Patent-6,193,917; US-Patent-Appl-SN-606109; US-Patent-Appl-SN-218652; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

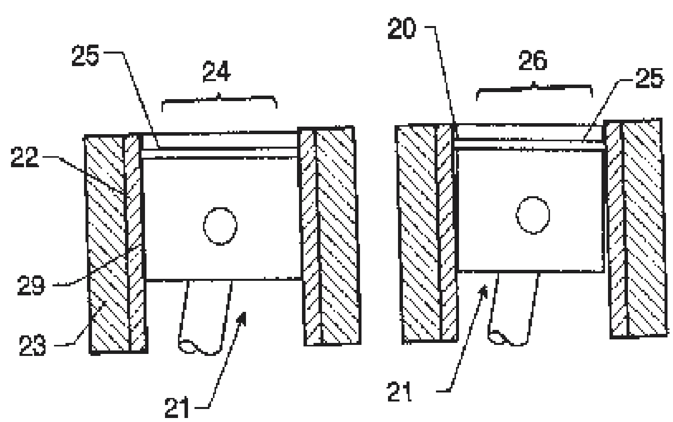
A composite tank for containing liquid oxygen and the method of making the same wherein a water-soluble mandrel having the desired tank configuration and a cylindrical A method of making a composite tank for containing liquid oxygen configuration of the mandrel and an outer boss conforming to the configuration of the inner boss, the bosses each having a tubular portion for receiving the protuberance on the mandrel and a spherical portion. The mandrel and the bosses are first coated with a nickel coating. The mandrel is then wrapped with graphite fibers wetted with an epoxy resin and this resin is cured. A layer of insulating foam is then applied to the tank and cured. The insulating foam is machined to a desired configuration and a layer of aramid fibers

wetted with a second epoxy resin is wrapped around the tank. The second resin is cured and the water soluble mandrel is washed from inside the tank.
Official Gazette of the U.S. Patent and Trademark Office
Mandrels; Graphite-Epoxy Composites; Epoxy Resins



20020006186 NASA Langley Research Center, Hampton, VA USA
Pistons and Cylinders Made of Carbon-Carbon Composite Materials
Rivers, H. Kevin, Inventor, NASA Langley Research Center, USA; Ransone, Philip O., Inventor, NASA Langley Research Center, USA; Northam, G. Burton, Inventor, NASA Langley Research Center, USA; Schwind, Francis A., Inventor, NASA Langley Research Center, USA; Nov. 21, 2000; 10p; In English; Division of US-Patent-Appl-SN-808290, filed 28 Feb. 1997
Patent Info.: Filed 11 Jan. 2000; NASA-Case-LAR-15493-1; US-Patent-6,148,785; US-Patent-Appl-SN-480421; US-Patent-Appl-SN-808290; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An improved reciprocating internal combustion engine has a plurality of engine pistons, which are fabricated from carbon---carbon composite materials, in operative association with an engine cylinder block, or an engine cylinder tube, or an engine cylinder jug, all of which are also fabricated from carbon-carbon composite materials.
Author
Carbon-Carbon Composites; Fabrication; Piston Engines; Cylindrical Bodies



20020038552 NASA Kennedy Space Center, Cocoa Beach, FL USA

Conducting Compositions of Matter

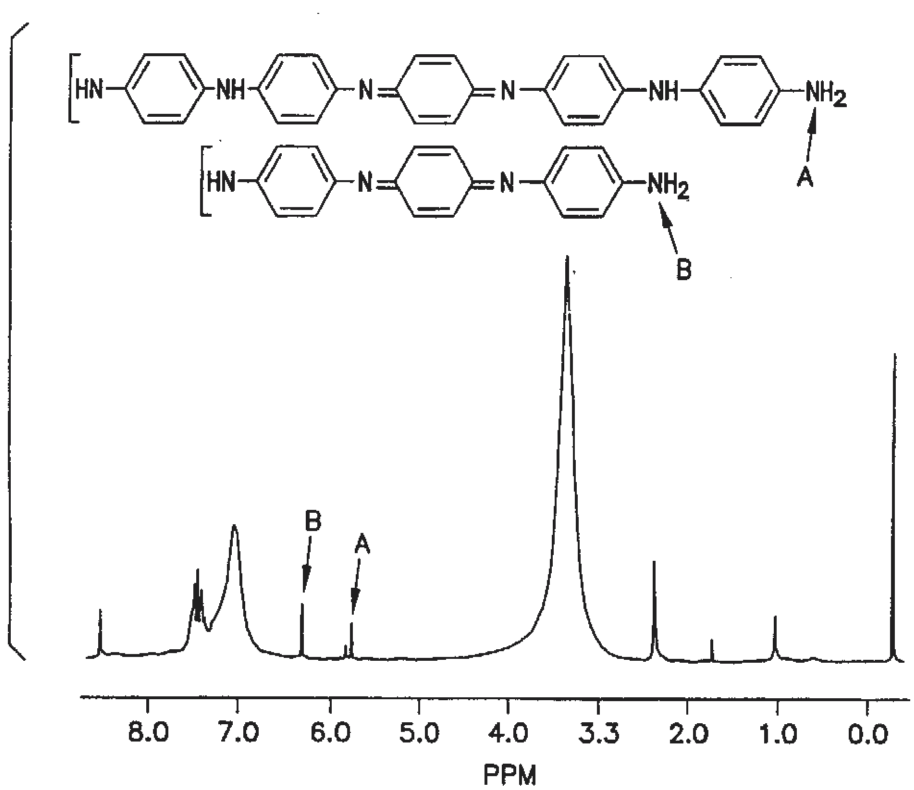
Viswanathan, Tito, Inventor, NASA Kennedy Space Center, USA; Oct. 09, 2001; 10p; In English; Continuation of US-Patent-Appl-SN-369274, filed 6 Aug. 1999, which is a division of US-Appl-SN-034063, filed 3 Mar. 1998, which is a provision of US-Patent-Appl-SN-040786, filed 3 Mar. 1997

Patent Info.: Filed 17 Feb. 2000; NASA-Case-KSC-11940-2; US-Patent-6,299,800; US-Patent-Appl-SN-507092; US-Patent-Appl-SN-369274; US-Patent-Appl-SN-034063; US-Patent-Appl-SN-040786; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The invention provides conductive compositions of matter, as well as methods for the preparation of the conductive compositions of matter, solutions comprising the conductive compositions of matter, and methods of preparing fibers or fabrics having improved anti-static properties employing the conductive compositions of matter.

Official Gazette of the U.S. Patent and Trademark Office

Electrical Properties; Fibers; Fabrics; Conductors



25
INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

20020060458 NASA Marshall Space Flight Center, Huntsville, AL USA

Gravity Responsive NADH Oxidase of the Plasma Membrane

Morre, D. James, Inventor, NASA Marshall Space Flight Center, USA; Mar. 26, 2002; 8p; In English

Patent Info.: Filed 25 Apr. 2000; NASA-Case-MFS-31387-1; US-Patent-6,361,961; US-Patent-Appl-SN-560532; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

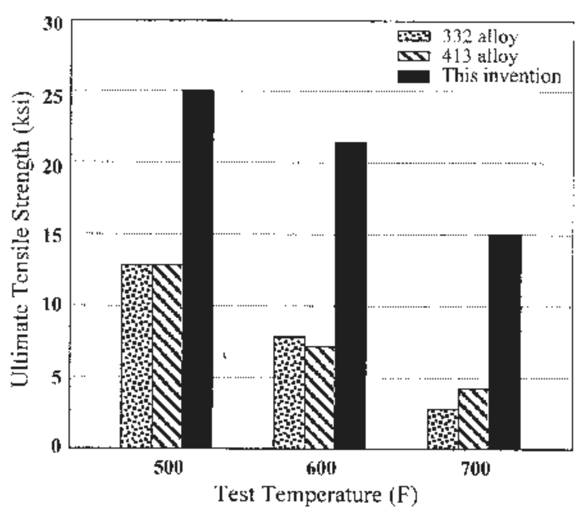
A method and apparatus for sensing gravity using an NADH oxidase of the plasma membrane which has been found to respond to unit gravity and low centrifugal g forces. The oxidation rate of NADH supplied to the NADH oxidase is measured and

translated to represent the relative gravitational force exerted on the protein. The NADH oxidase of the plasma membrane may be obtained from plant or animal sources or may be produced recombinantly.
Official Gazette of the U.S. Patent and Trademark Office
Membranes; Oxidase; Proteins; Gravitational Fields; Sensors

26
METALS AND METALLIC MATERIALS

20020060119 NASA Marshall Space Flight Center, Huntsville, AL USA
Aluminum-Silicon Alloy Having Improved Properties at Elevated Temperatures and Articles Cast Therefrom
Lee, Jonathan A., Inventor, NASA Marshall Space Flight Center, USA; Chen, Po-Shou, Inventor, NASA Marshall Space Flight Center, USA; Jun. 04, 2002; 6p; In English; Continuation-in-part of US-Patent-Appl-SN-322768, filed on 25 May 1999, which is a continuation-in-part of US-Patent-Appl-SN-218675, filed on 22 Dec. 1998, which is a division of US-Patent-Appl-SN-152469, filed on 8 Sep. 1998
Patent Info.: Filed 11 Oct. 2000; NASA-Case-MFS-31294-S-CIP; US-Patent-6,399,020; US-Patent-Appl-SN-688729; US-Patent-Appl-SN-322768; US-Patent-Appl-SN-218675; US-Patent-Appl-SN-152469; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

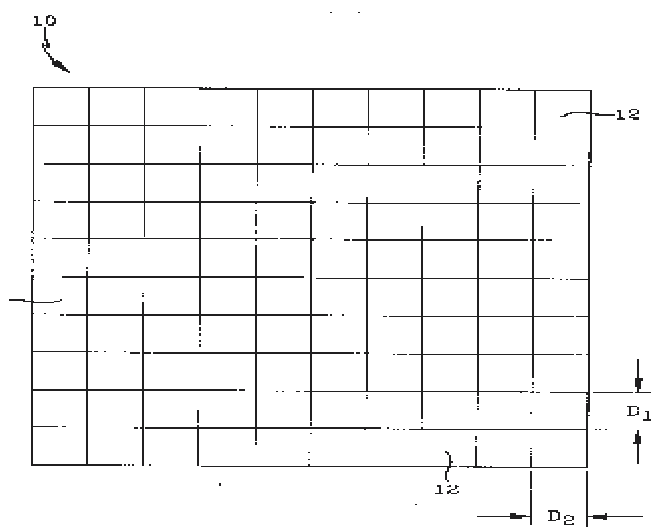
An aluminum alloy suitable for high temperature applications, such as heavy duty pistons and other internal combustion applications. having the following composition, by weight percent (wt %): Silicon: 11.0-14.0; Copper: 5.6-8.0; Iron: 0-0.8; Magnesium: 0.5-1.5; Nickel: 0.05-0.9; Manganese: 0.5-1.5; Titanium: 0.05-1.2; Zirconium: 0.12-1.2; Vanadium: 0.05-1.2; Zinc: 0.005-0.9; Strontium: 0.001-0.1; Aluminum: balance. In this alloy the ratio of silicon:magnesium is 10-25, and the ratio of copper:magnesium is 4-15. After an article is cast from this alloy, the article is treated in a solutionizing step which dissolves unwanted precipitates and reduces any segregation present in the original alloy. After this solutionizing step, the article is quenched, and is then aged at an elevated temperature for maximum strength.
Official Gazette of the U.S. Patent and Trademark Office
Aluminum Alloys; Silicon Alloys; Heat Treatment



Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see 24 Composite Materials.

20020010367 NASA Glenn Research Center, Cleveland, OH USA
Segmented Thermal Barrier Coating
Smialek, James L., Inventor, NASA Glenn Research Center, USA; Nov. 13, 2001; 16p; In English
Patent Info.: Filed 14 Mar. 2000; NASA-Case-LEW-16803-1; US-Patent-6,316,078; US-Patent-Appl-SN-525372; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

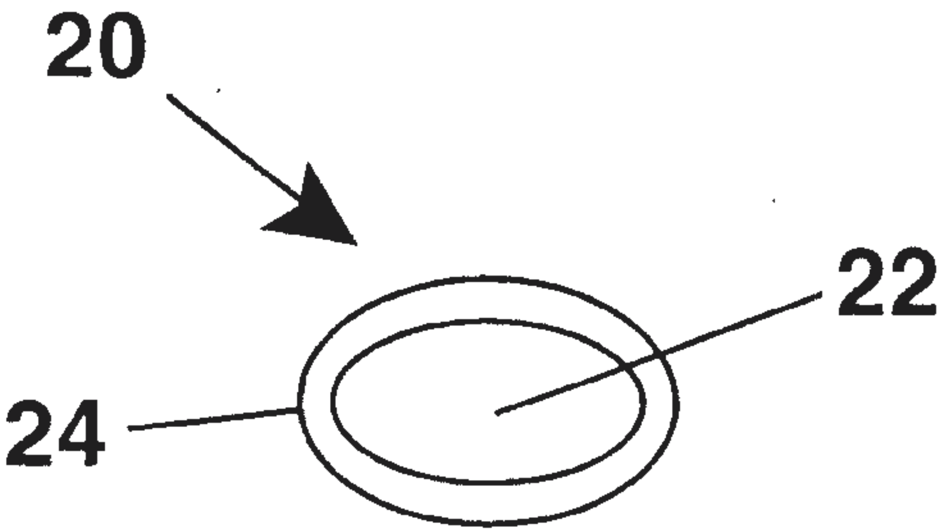
The article has a macro-segmented thermal barrier coating due to the presence of a pattern of three-dimensional features. The features may be a series of raised ribs formed on the substrate surface and being spaced from 0.05 inches to 0.30 apart. The ribs have a width ranging from 0.005 inches to 0.02 inches, and a height ranging from 25% to 100% of the thickness of the barrier coating. Alternately, the features may be a similar pattern of grooves formed in the surface of the substrate. Other embodiments provide segmentation by grooves or ribs in the bond coat or alternately grooves formed in the thermal barrier layer.
Official Gazette of the U.S. Patent and Trademark Office
Protective Coatings; Segments; Thermal Control Coatings; Grooves



20020060087 NASA Langley Research Center, Hampton, VA USA
Molecular Level Coating of Metal Oxide Particles
McDaniel, Patricia R., Inventor, NASA Langley Research Center, USA; St.Clair, Terry L., Inventor, NASA Langley Research Center, USA; Apr. 09, 2002; 10p; In English; Division of US-Patent-Appl-SN-742068, filed 31 Oct. 1996
Patent Info.: Filed 1 Feb. 2000; NASA-Case-LAR-15555-2; US-Patent-6,368,662; US-Patent-Appl-SN-495575; US-Patent-Appl-SN-742068; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Polymer encapsulated metal oxide particles are prepared by combining a polyamide acid in a polar osmotic solvent with a metal alkoxide solution. The polymer was imidized and the metal oxide formed simultaneously in a refluxing organic solvent. The resulting polymer-metal oxide is an intimately mixed commingled blend, possessing, synergistic properties of both the polymer and preceramic metal oxide. The encapsulated metal oxide particles have multiple uses including, being useful in the

production of skin lubricating creams, weather resistant paints, as a filler for paper. making ultraviolet light stable filled printing ink, being extruded into fibers or ribbons, and coatings for fibers used in the production of composite structural panels.
Official Gazette of the U.S. Patent and Trademark Office
Metal Oxides; Encapsulating; Coating



20020060231 NASA Langley Research Center, Hampton, VA USA
Composition of and Method for Making High Performance Resins for Infusion and Transfer Molding Processes
Connell, John W., Inventor, NASA Langley Research Center, USA; Smith, Joseph G., Inventor, NASA Langley Research Center, USA; Hergenrother, Paul M., Inventor, NASA Langley Research Center, USA; Mar. 19, 2002; 48p; In English
Patent Info.: Filed 18 May 2000; NASA-Case-LAR-15834-1; US-Patent-6,359,107; US-Patent-Appl-SN-575826; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A composition of and method for making high performance imide resins that are processable by resin transfer molding (RTM) and resin infusion (RI) techniques were developed. Materials with a combination of properties, making them particularly useful for the fabrication of composite parts via RTM and/or RI processes, were prepared, characterized and fabricated into moldings and carbon fiber reinforced composites and their mechanical properties were determined. These materials are particularly useful for the fabrication of structural composite components for aerospace applications. The method for making high performance resins for RTM and RI processes is a multi-faceted approach. It involves the preparation of a mixture of products from a combination of aromatic diamines and aromatic dianhydrides at relatively low calculated molecular weights (i.e. high stoichiometric offsets) and endcapping with latent reactive groups. The combination of these monomers results in a mixture of products, in the imide form, that exhibits a stable melt viscosity of less than approximately 60 poise below approximately 300 C.
Official Gazette of the U.S. Patent and Trademark Office
Polyimide Resins; Diamines; Anhydrides; Monomers; Resin Transfer Molding

28
PROPELLANTS AND FUELS

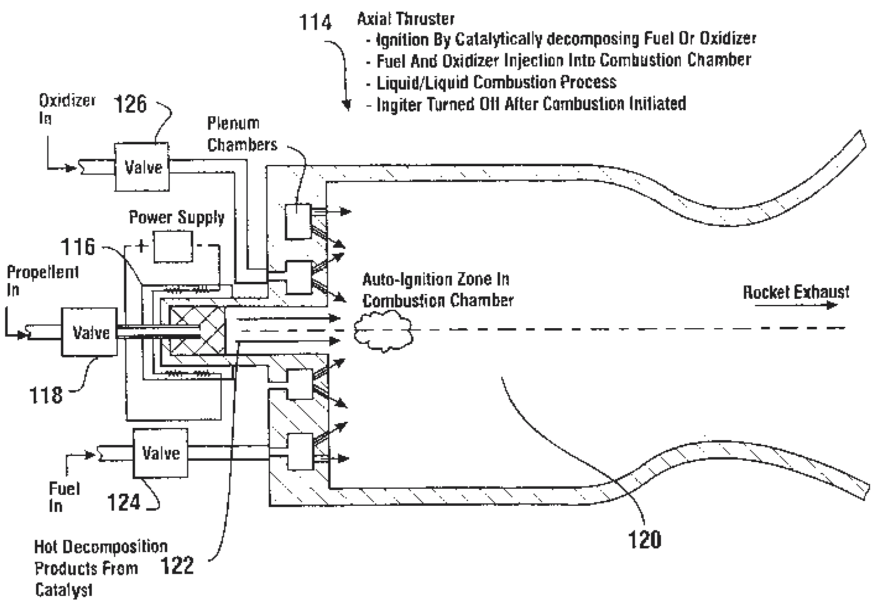
Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 44 Energy Production and Conversion.

20020060113 NASA Glenn Research Center, Cleveland, OH USA
Reduced Toxicity Fuel Satellite Propulsion System Including Catalytic Decomposing Element with Hydrogen Peroxide
Schneider, Steven J., Inventor, NASA Glenn Research Center, USA; Apr. 30, 2002; 30p; In English; Division of US-Patent-Appl-SN-291883, filed 14 Apr. 1999
Patent Info.: Filed 17 Apr. 2001; NASA-Case-LEW-16636-2; US-Patent-6,378,291; US-Patent-Appl-SN-837822; US-Patent-Appl-SN-291883; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A reduced toxicity fuel satellite propulsion system including a reduced toxicity propellant supply for consumption in an axial class thruster and an ACS class thruster. The system includes suitable valves and conduits for supplying the reduced toxicity propellant to the ACS decomposing element of an ACS thruster. The ACS decomposing element is operative to decompose the reduced toxicity propellant into hot propulsive gases. In addition the system includes suitable valves and conduits for supplying the reduced toxicity propellant to an axial decomposing element of the axial thruster. The axial decomposing element is operative to decompose the reduced toxicity propellant into hot gases. The system further includes suitable valves and conduits for supplying a second propellant to a combustion chamber of the axial thruster, whereby the hot gases and the second propellant auto-ignite and begin the combustion process for producing thrust.

Official Gazette of the U.S. Patent and Trademark Office

Spacecraft Propulsion; Catalytic Activity; Toxicity; Rocket Engine Design; Fuel Systems

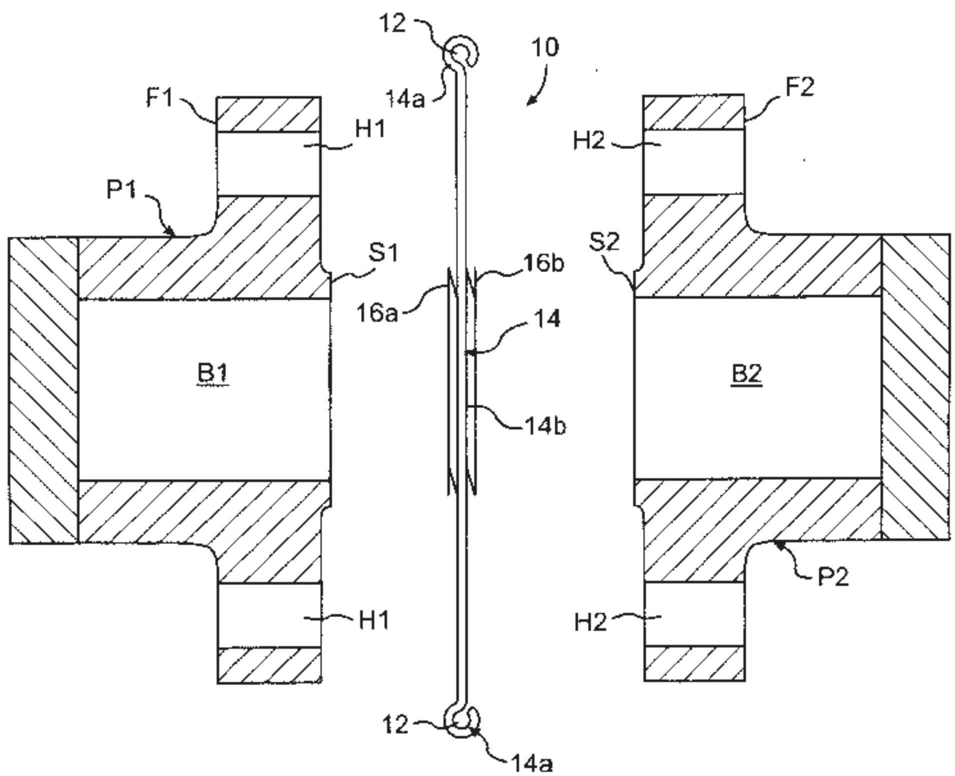


31
ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

20020060084 NASA Marshall Space Flight Center, Huntsville, AL USA
Thermally Activated Joining Apparatus
Bryant, Melvin A., III, Inventor, NASA Marshall Space Flight Center, USA; Jun. 04, 2002; 6p; In English
Patent Info.: Filed 16 Mar. 2000; NASA-Case-MFS-31454; US-Patent-6,398,264; US-Patent-Appl-SN-528794; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

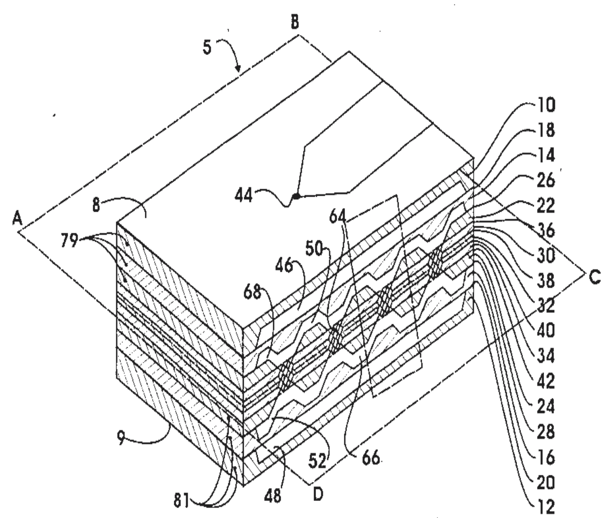
A thermally activated joining apparatus is provided for reversibly joining piping components of a fluid management system. The joining apparatus includes a thermally activated sealant layers for securing the components together in a leakage free manner. A thermal conductor includes a ring shaped contact portion disposed between the layers for transferring heat from one or more heating elements to the sealant layers. After the seal in place, the components can later be disconnected by supplying heat from the heating element or elements through the thermal conductor to the sealant layers to cause breaking of the seal and thereby enable separation of components.
Official Gazette of the U.S. Patent and Trademark Office
Fluid Management; Heating; Sealers; Joints (Junctions)



20020060116 NASA Glenn Research Center, Cleveland, OH USA
Micro-Scalable Thermal Control Device
Moran, Matthew E., Inventor, NASA Glenn Research Center, USA; May 14, 2002; 26p; In English
Patent Info.: Filed 12 Jul. 2001; NASA-Case-LEW-17068-1; US-Patent-6,385,973; US-Patent-Appl-SN-906012; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

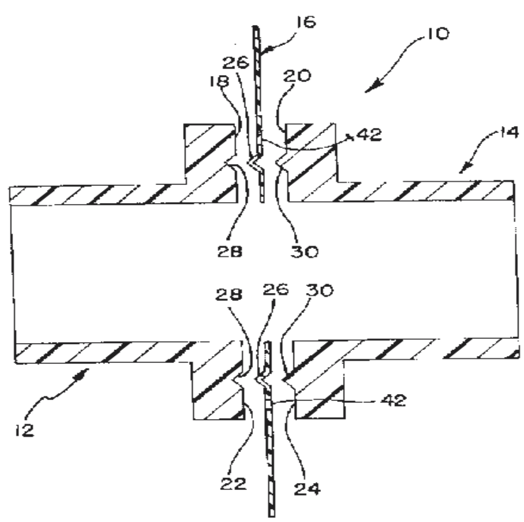
A microscalable thermal control module consists of a Stirling cycle cooler that can be manipulated to operate at a selected temperature within the heating and cooling range of the module. The microscalable thermal control module is particularly suited for controlling the temperature of devices that must be maintained at precise temperatures. It is particularly suited for controlling the temperature of devices that need to be alternately heated or cooled. The module contains upper and lower opposing diaphragms, with a regenerator region containing a plurality of regenerators interposed between the diaphragms. Gaps exist on each side of each diaphragm to permit it to oscillate freely. The gap on the interior side one diaphragm is in fluid connection with the gap on the interior side of the other diaphragm through regenerators. As the diaphragms oscillate working gas is forced through the regenerators. The surface area of each regenerator is sufficiently large to effectively transfer thermal energy to and from the working gas as it is passed through them. The phase and amplitude of the oscillations can be manipulated electronically to control the steady state temperature of the active thermal control surface, and to switch the operation of the module from cooling to

heating, or vice versa. The ability of the microscalable thermal control module to heat and cool may be enhanced by operating a plurality of modules in series, in parallel, or in connection through a shared bottom layer.
Official Gazette of the U.S. Patent and Trademark Office
Temperature Control; Regenerators; Control Equipment



20020060233 NASA Marshall Space Flight Center, Huntsville, AL USA
Structural Assembly Device
Bryant, Melvin A., III, Inventor, NASA Marshall Space Flight Center, USA; May 28, 2002; 6p; In English
Patent Info.: Filed 16 Mar. 2000; NASA-Case-MFS-31403-1; US-Patent-6,394,501; US-Patent-Appl-SN-528792; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A structural assembly device and method for securing together a pair of surfaces of two fusible materials wherein an electrically conductive thermal element is located between the surfaces which will melt, without substantially degrading, when heated. When the thermal element is heated, it is elevated to a temperature sufficient to melt the first and second elements and then is allowed to cool such that the first and second elements are joined to the thermal element and may be joined to each other as well.
Official Gazette of the U.S. Patent and Trademark Office
Joining; Melting; Joints (Junctions)



32
COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications. For related information see also 04 Aircraft Communications and Navigation and 17 Space Communications, Spacecraft Communications, Command and Tracking. For search and rescue see 03 Air Transportation and Safety, and 16 Space Transportation.

20020005129 NASA Marshall Space Flight Center, Huntsville, AL USA

Lidar Remote Sensing System

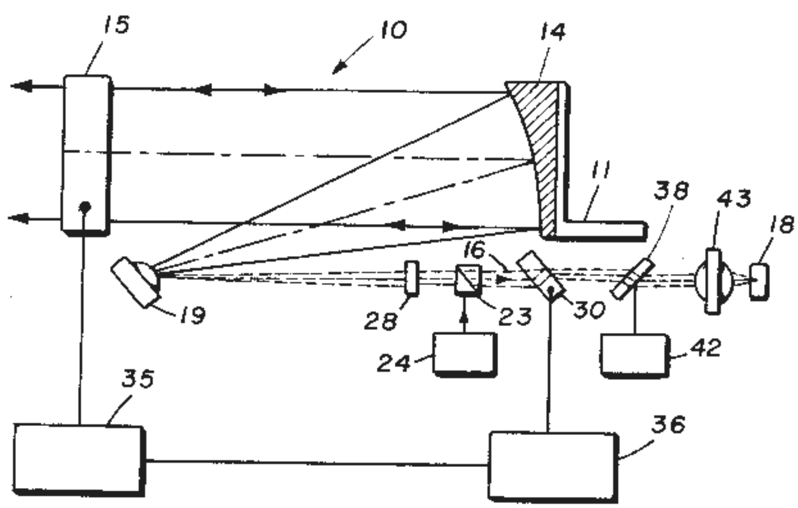
Kavaya, Michael J., Inventor, NASA Marshall Space Flight Center, USA; Amzajerdian, Farzin, Inventor, NASA Marshall Space Flight Center, USA; Nov. 14, 2000; 6p; In English; Provisional US-Patent-Appl-SN-060001, filed 22 Aug. 1997

Patent Info.: Filed 14 Aug. 1998; NASA-Case-MFS-26395; US-Patent-6,147,747; US-Patent-Appl-SN-134704; US-Patent-Appl-SN-060001; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A lidar remote sensing system wherein a laser signal is transmitted along an optical path through a telescope having a primary and secondary mirrors and a rotating prism at the telescope output. When the reflected signal from the target is received it is passed back through the system to a detector, where it is heterodyned with a signal from a local oscillator to detect Doppler frequency shifts in the returned signal. Since the prism is rotating, the prism will be at one position when the signal is transmitted and at another when the returned signal is received. This causes the reflected signal to be off the optical path, reducing the power of the returned signal. to correct this problem a de-rotator or prism is mounted for rotation, in synchronism with the rotating prism. about the optical path in a position to intersect the returned beam and refract it back onto the optical path to reduce the power loss in the returned signal.

Official Gazette of the U.S. Patent and Trademark Office

Optical Paths; Prisms; Rotation; Synchronism



33
ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry. For related information see also 60 Computer Operations and Hardware and 76 Solid-State Physics.

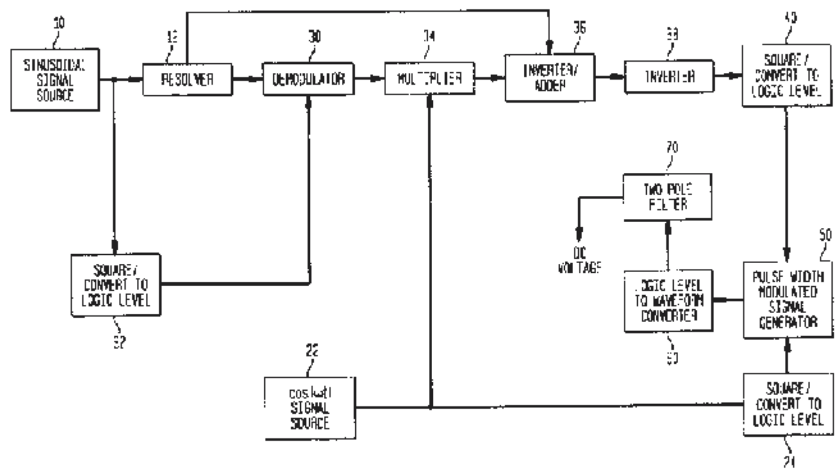
20020005121 NASA Marshall Space Flight Center, Huntsville, AL USA

Arc-Tangent Circuit for Continuous Linear Output

Alhorn, Dean C., Inventor, NASA Marshall Space Flight Center, USA; Howard, David E., Inventor, NASA Marshall Space Flight Center, USA; Smith, Dennis A., Inventor, NASA Marshall Space Flight Center, USA; Oct. 24, 2000; 10p; In English

Patent Info.: Filed 27 Nov. 1998; NASA-Case-MFS-31219-1; US-Patent-6,138,131; US-Patent-Appl-SN-208400; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A device suitable for determining arc-tangent of an angle theta is provided. Circuitry generates a first square wave at a frequency omega(t) and a second square wave at the frequency omega(t) but shifted by a phase difference equal to the angle theta. A pulse width modulation signal generator processes the first and second square waves to generate a pulse width modulation signal having a frequency of omega(t) and having a pulse width that is a function of the phase difference theta. The pulse width modulation signal is converted to a DC voltage that is a linear representation of the phase difference theta.
Official Gazette of the U.S. Patent and Trademark Office
Pulse Duration Modulation; Square Waves; Tangents; Measuring Instruments

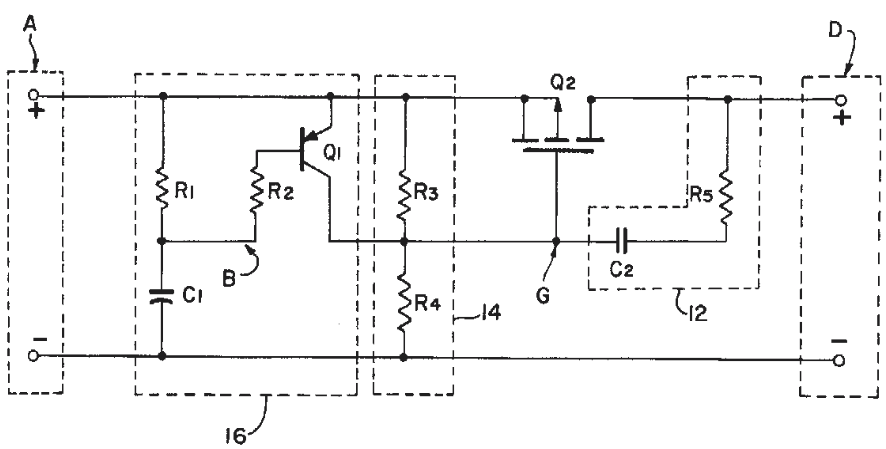


20020039322 NASA Pasadena Office, CA USA

Inrush Current Control Circuit

Cole, Steven W., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Jan. 01, 2002; 7p; In English
Patent Info.: Filed 17 Mar. 2000; US-Patent-6,335,654; US-Patent-Appl-SN-528800; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An inrush current control circuit having an input terminal connected to a DC power supply and an output terminal connected to a load capacitor limits the inrush current that charges up the load capacitor during power up of a system. When the DC power supply applies a DC voltage to the input terminal, the inrush current control circuit produces a voltage ramp at the load capacitor instead of an abrupt DC voltage. The voltage ramp results in a constant low level current to charge up the load capacitor, greatly reducing the current drain on the DC power supply.
Official Gazette of the U.S. Patent and Trademark Office
Direct Current; Power Supply Circuits; Control Systems Design; Electric Potential



20020060072 NASA Marshall Space Flight Center, Huntsville, AL USA

Process for a High Efficiency Class D Microwave Power Amplifier Operating in the S-Band

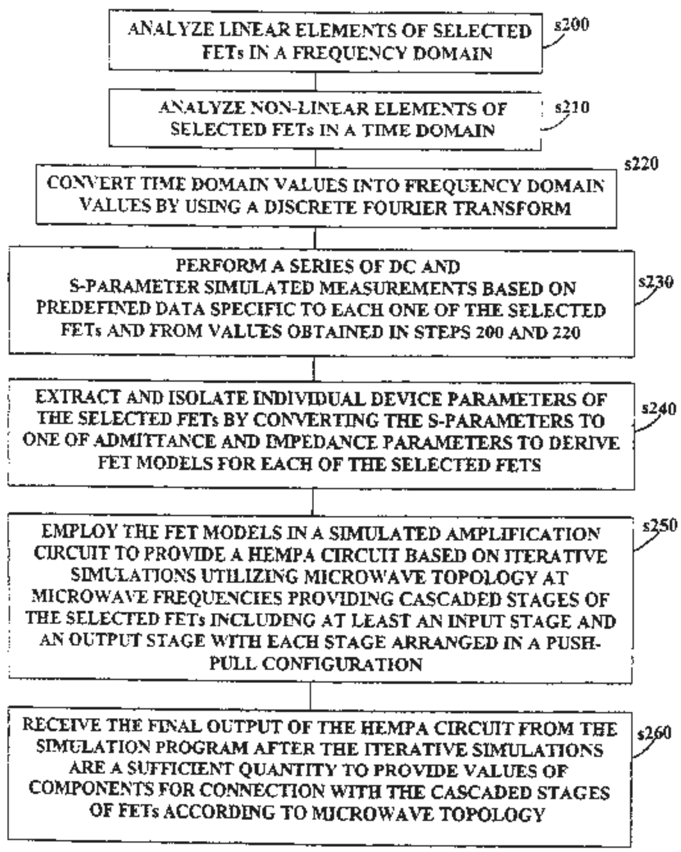
Sims, William Herbert, III, Inventor, NASA Marshall Space Flight Center, USA; May 14, 2002; 34p; In English

Patent Info.: Filed 3 Nov. 2000; NASA-Case-MFS-31455-1; US-Patent-6,388,512; US-Patent-Appl-SN-707290; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A process and product providing a High Efficiency Microwave Power Amplifier (HEMPA) which propagates S-Band microwave frequency square waves; utilizing a program simulating FETs at high DC-to-RF efficiencies, which analyses linear elements of selected FETs in a frequency domain, and non-linear elements of the FETs in a time domain, and converts the time domain values into the frequency domain, and performs DC and S-parameter simulated measurements based on predefined data for each FET. Individual FET parameters are extracted and isolated by converting the S-parameters to admittance or impedance parameters to derive FET models for each FET, which the program uses to provide a final output of a HEMPA circuit based on iterative simulations of an amplification circuit utilizing microwave topology and frequencies. Iterative simulations of the amplification circuit analyze output values of a plurality of cascaded stages of the FETs, which are arranged in a push-pull configuration.

Official Gazette of the U.S. Patent and Trademark Office

Microwave Amplifiers; Power Amplifiers; Square Waves; Field Effect Transistors; Superhigh Frequencies



20020060092 NASA Glenn Research Center, Cleveland, OH USA

Design and Manufacturing Processes of Long-Life Hollow Cathode Assemblies

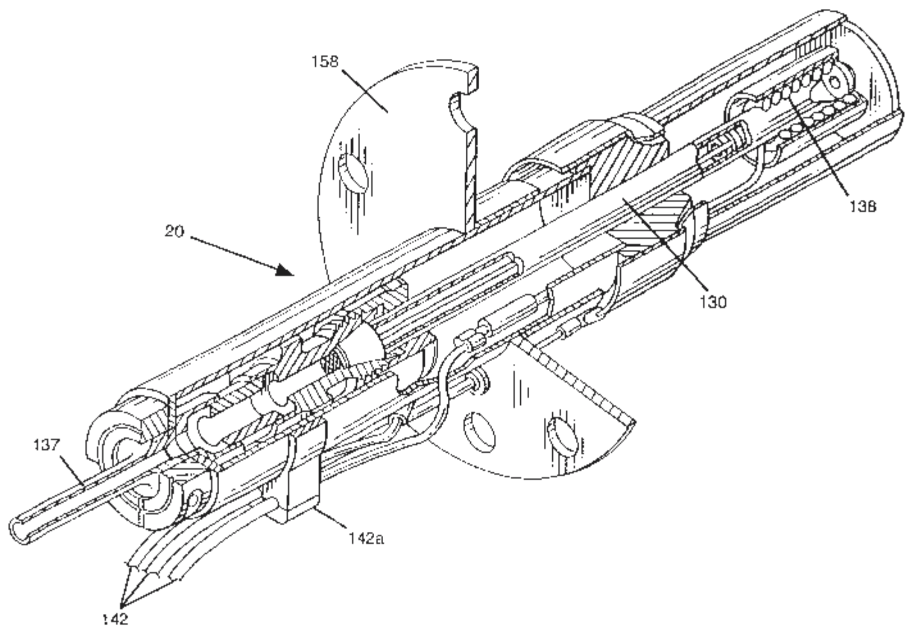
Patterson, Michael J., Inventor, NASA Glenn Research Center, USA; Verhey, Timothy R., Inventor, NASA Glenn Research Center, USA; Soulas, George C., Inventor, NASA Glenn Research Center, USA; Apr. 30, 2002; 18p; In English; Division of US-Patent-Appl-SN-503658, filed 14 Dec. 2000, which is a division of US-Patent-Appl-SN-152407, filed 14 Sep. 1998

Patent Info.: Filed 28 Dec. 2000; NASA-Case-LEW-16056-3; US-Patent-6,380,685; US-Patent-Appl-SN-754388; US-Patent-Appl-SN-503658; US-Patent-Appl-SN-152407; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The design and manufacturing processes for Hollow Cathode Assemblies (HCA's) that operate over a broad range of emission currents up to 30 Amperes, at low potentials, with lifetimes in excess of 17,500 hours. The processes include contamination control procedures which cover hollow cathode component cleaning procedures, gas feed system designs and specifications, and hollow cathode activation and operating procedures to thereby produce cathode assemblies that have demonstrated stable and repeatable operating conditions, for both the discharge current and voltage. The HCA of this invention provides lifetimes of greater than 10,000 hours, and expected lifetimes of greater than 17,500 hours, whereas the present state-of-the-art is less than 500 hours at emission currents in excess of 1 Ampere. Stable operation is provided over a large range of operating emission currents, up to a 6:1 ratio, and this HCA can emit electron currents of up to 30 Amperes in magnitude to an external anode that simulates the current drawn to a space plasma at voltages of less than 20 Volts.

Official Gazette of the U.S. Patent and Trademark Office

Hollow Cathodes; Contamination; Feed Systems



20020060232 NASA Johnson Space Center, Houston, TX USA

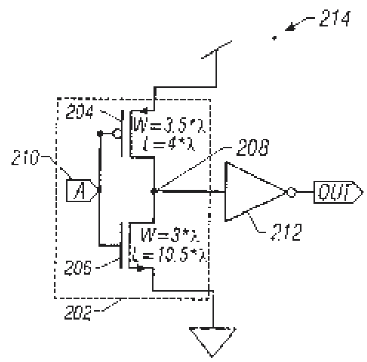
Method and Apparatus for Reducing the Vulnerability of Latches to Single Event Upsets

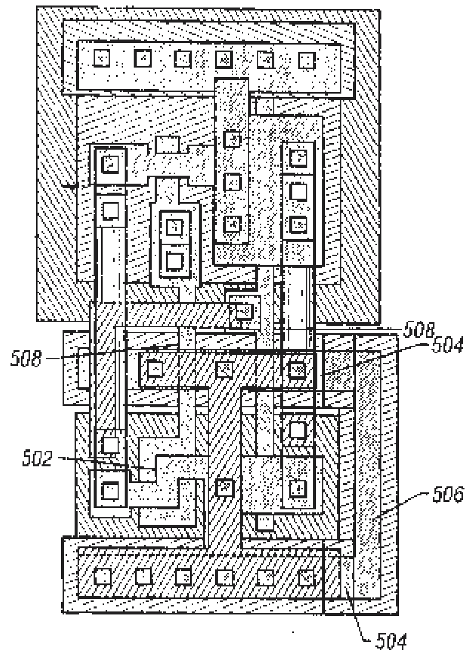
Shuler, Robert L., Jr., Inventor, NASA Johnson Space Center, USA; Apr. 23, 2002; 22p; In English

Patent Info.: Filed 13 Mar. 2000; NASA-Case-MSC-22953-1; US-Patent-6,377,097; US-Patent-Appl-SN-525371; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A delay circuit includes a first network having an input and an output node, a second network having an input and an output, the input of the second network being coupled to the output node of the first network. The first network and the second network are configured such that: a glitch at the input to the first network having a length of approximately one-half of a standard glitch time or less does not cause the voltage at the output of the second network to cross a threshold, a glitch at the input to the first network having a length of between approximately one-half and two standard glitch times causes the voltage at the output of the second network to cross the threshold for less than the length of the glitch, and a glitch at the input to the first network having a length of greater than approximately two standard glitch times causes the voltage at the output of the second network to cross the threshold for approximately the time of the glitch. The method reduces the vulnerability of a latch to single event upsets. The latch

includes a gate having an input and an output and a feedback path from the output to the input of the gate. The method includes inserting a delay into the feedback path and providing a delay in the gate.
Official Gazette of the U.S. Patent and Trademark Office
Delay Circuits; Latches; Single Event Upsets



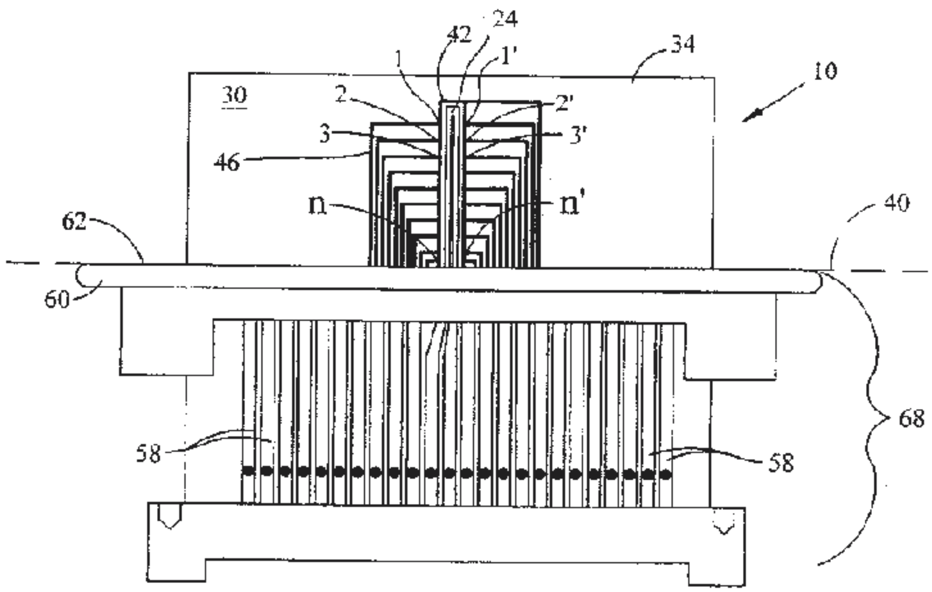


34
FLUID MECHANICS AND THERMODYNAMICS

20020060115 NASA Glenn Research Center, Cleveland, OH USA
Thermocouple Boundary Layer Rake
Hwang, Danny P., Inventor, NASA Glenn Research Center, USA; Will, Herbert A., Inventor, NASA Glenn Research Center, USA; Fralick, Gustave C., Inventor, NASA Glenn Research Center, USA; May 07, 2002; 10p; In English
Patent Info.: Filed 28 Jun. 2000; NASA-Case-LEW-16999-1; US-Patent-6,382,024; US-Patent-Appl-SN-613052; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Apparatus and method for providing a velocity flow profile near a reference surface. A measuring device utilizes a plurality of thermojunction pairs to provide the velocity flow profile in accordance with behavior of a gas relative to a constant thickness strut which stands vertically from the reference surface such that the span is normal to the surface, and the chord is parallel to the surface along the initial flow direction. Each thermojunction is carried on either side of a heater formed on a measuring surface in a constant thickness portion of a strut. Additionally, each thermojunction of a given pair is located at a predetermined height

from the reference surface. Gas velocity data obtained from temperature differentials from one side of the heater to the other at each successive height is utilized to generate the velocity and turbulence level profiles.
Official Gazette of the U.S. Patent and Trademark Office
Boundary Layers; Thermocouples; Velocity Distribution



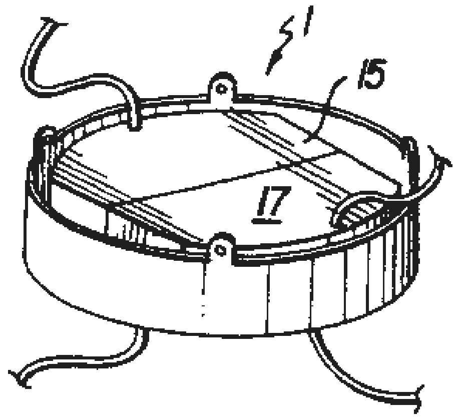
35
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography. For aerial photography see 43 Earth Resources and Remote Sensing. For related information see also 06 Aircraft Instrumentation, and 19 Space Instrumentation.

20020005119 NASA Marshall Space Flight Center, Huntsville, AL USA
Non-Contact Linear Actuator Position Sensor Having a PID-Compensating Controller
Alhorn, Dean C., Inventor, NASA Marshall Space Flight Center, USA; Howard, David E., Inventor, NASA Marshall Space Flight Center, USA; Jun. 12, 2001; 10p; In English
Patent Info.: Filed 27 Nov. 1998; NASA-Case-MFS-31218; US-Patent-6,246,228; US-Patent-Appl-SN-209363; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

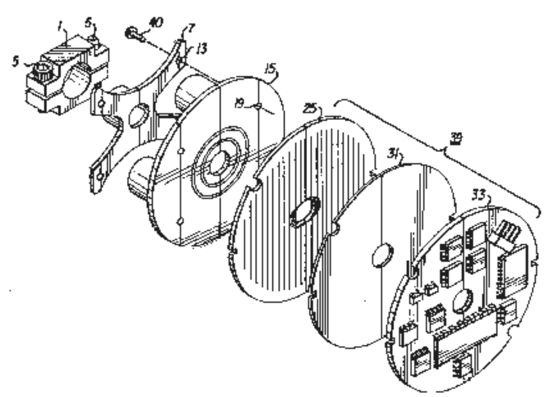
A position sensor or controller generates a response signal in existing armature windings of an actuator and detects the response signal to determine the position of the armature. to generate the response signal, the actuator includes a sensor excitation winding near the armature. Two sensor excitation windings can be provided, above and below the armature, to cancel out z components and thus allow for a variable gap. The sensor excitation winding or windings are supplied with an excitation signal to induce the response signal in the armature windings. The response signal is derived by differentially amplifying and frequency filtering a raw output of the armature windings. The response signal is demodulated to determine position. If a position controller

rather than a mere sensor is desired, the position signal can be buffered, PID compensated, amplified, and fed back to the armature windings.
Official Gazette of the U.S. Patent and Trademark Office
Actuators; Armatures; Controllers; Excitation; Winding



20020005125 NASA Marshall Space Flight Center, Huntsville, AL USA
Position Sensor with Integrated Signal-Conditioning Electronics on a Printed Wiring Board
Alhorn, Dean C., Inventor, NASA Marshall Space Flight Center, USA; Howard, David E., Inventor, NASA Marshall Space Flight Center, USA; Smith, Dennis A., Inventor, NASA Marshall Space Flight Center, USA; Nov. 06, 2001; 9p; In English
Patent Info.: Filed 27 Nov. 1998; NASA-Case-MFS-31238-1; US-Patent-6,313,624; US-Patent-Appl-SN-208401; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A position sensor, such as a rotary position sensor, includes the signal-conditioning electronics in the housing. The signal-conditioning electronics are disposed on a printed wiring board, which is assembled with another printed wiring board including the sensor windings to provide a sub-assembly. A mu-metal shield is interposed between the printed wiring boards to prevent magnetic interference. The sub-assembly is disposed in the sensor housing adjacent to an inductor board which turns on a shaft. The inductor board emanates an internally or externally generated excitation signal that induces a signal in the sensor windings. The induced signal represents the rotary position of the inductor board relative to the sensor winding board.
Official Gazette of the U.S. Patent and Trademark Office
Signal Processing; Sensors; Printed Circuits



20020060077 NASA Langley Research Center, Hampton, VA USA

Thermally Stable, Piezoelectric and Pyroelectric Polymeric Substrates and Method Relating Thereto

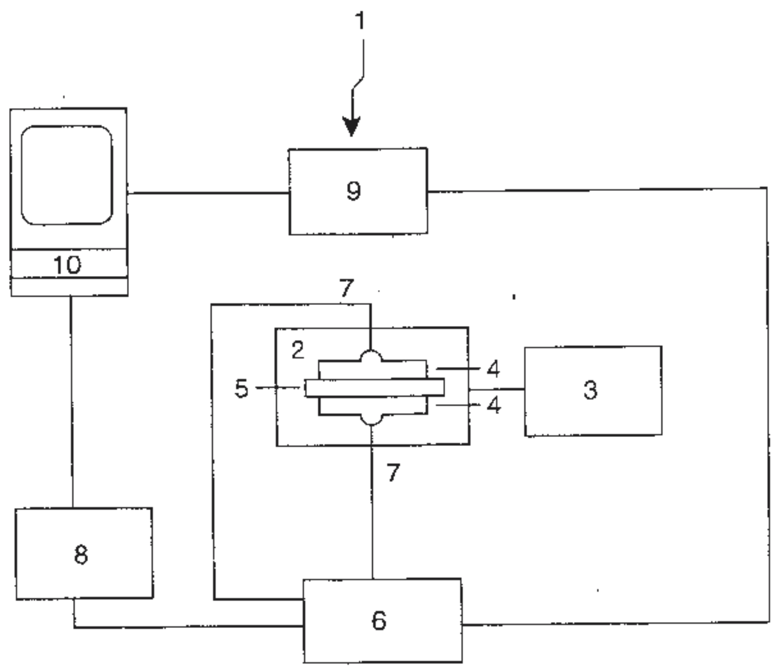
Simpson, Joycelyn O., Inventor, NASA Langley Research Center, USA; St.Claire, Terry L., Inventor, NASA Langley Research Center, USA; Apr. 30, 2002; 8p; In English; Continuation of US-Patent-Appl-SN-524855, filed 7 Sep. 1995

Patent Info.: Filed 18 Aug. 1998; NASA-Case-LAR-15279-3; US-Patent-6,379,809; US-Patent-Appl-SN-135888; US-Patent-Appl-SN-524855; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A thermally stable, piezoelectric and pyroelectric polymeric substrate was prepared, This thermally stable, piezoelectric and pyroelectric polymeric substrate may be used to prepare electromechanical transducers, thermomechanical transducers, accelerometers, acoustic sensors, infrared sensors, pressure sensors, vibration sensors, impact sensors. in-situ temperature sensors, in-situ stress/strain sensors, micro actuators, switches. adjustable fresnel lenses, speakers, tactile sensors, weather sensors, micro positioners, ultrasonic devices, power generators, tunable reflectors, microphones, and hydrophones. The process for preparing these polymeric substrates includes: providing a polymeric substrate having a softening temperature greater than 100 C; depositing a metal electrode material onto the polymer film; attaching a plurality of electrical leads to the metal electrode coated polymeric substrates; heating the metal electrode coated polymeric substrate in a low dielectric medium; applying a voltage to the heated metal electrode coated polymeric substrate to induce polarization; and cooling the polarized metal electrode coated polymeric electrode while maintaining a constant voltage.

Official Gazette of the U.S. Patent and Trademark Office

Accelerometers; Actuators; Dielectrics; Electric Potential; Thermal Stability; Pyroelectricity; Stress-Strain Relationships



20020060086 NASA Marshall Space Flight Center, Huntsville, AL USA

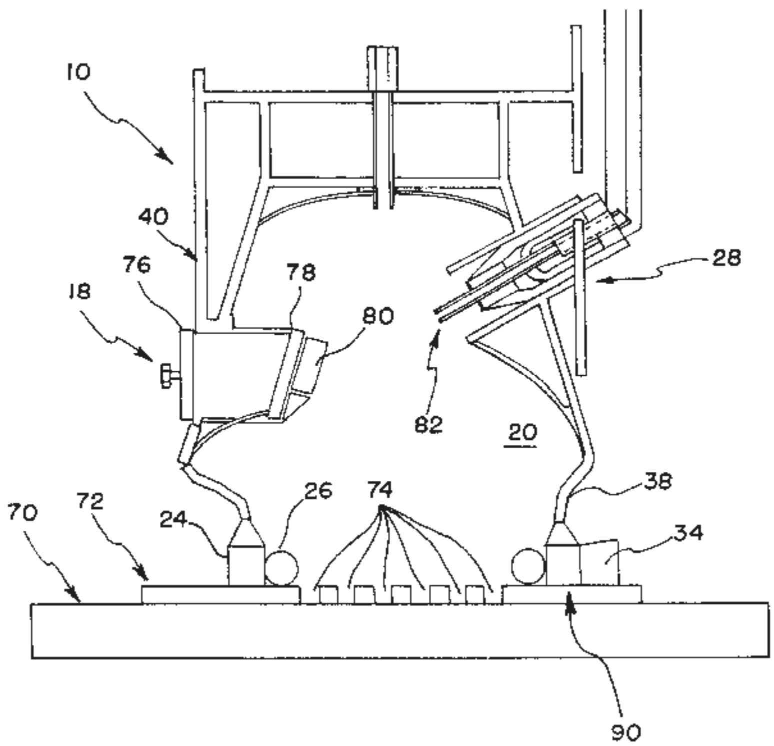
Vacuum Arc Vapor Deposition Method and Apparatus for Applying Identification Symbols to Substrates

Schramm, Harry F., Inventor, NASA Marshall Space Flight Center, USA; Roxby, Donald L., Inventor, NASA Marshall Space Flight Center, USA; Weeks, Jack L., Inventor, NASA Marshall Space Flight Center, USA; May 28, 2002; 8p; In English

Patent Info.: Filed 26 Oct. 2000; NASA-Case-MFS-31229; US-Patent-6,395,151; US-Patent-Appl-SN-703029; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An apparatus for applying permanent markings onto products using a Vacuum Arc Vapor Deposition (VAVD) marker by accelerating atoms or molecules from a vaporization source onto a substrate to form human and/or machine-readable part identification marking that can be detected optically or via a sensing device like x-ray, thermal imaging, ultrasound, magneto-optic, micro-power impulse radar, capacitance, or other similar sensing means. The apparatus includes a housing with a nozzle having a marking end. A chamber having an electrode, a vacuum port and a charge is located within the housing. The

charge is activated by the electrode in a vacuum environment and deposited onto a substrate at the marking end of the nozzle. The apparatus may be a hand-held device or be disconnected from the handle and mounted to a robot or fixed station.
Official Gazette of the U.S. Patent and Trademark Office
Vacuum Deposition; Marking; Identifying



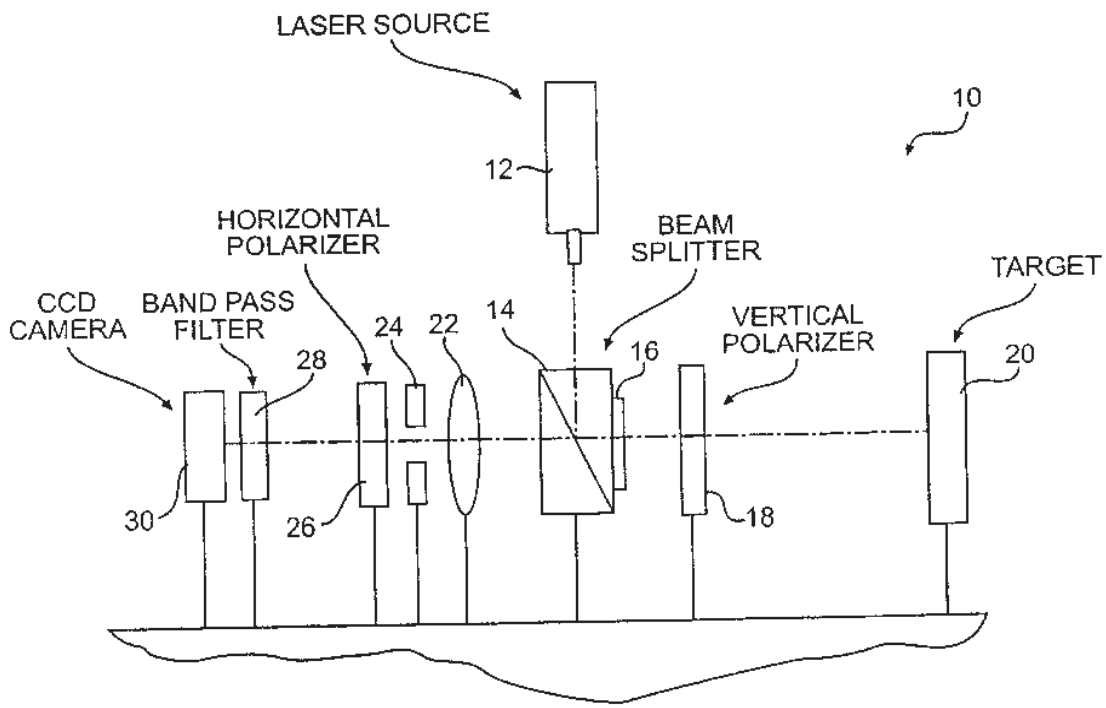
36
LASERS AND MASERS

Includes parametric amplifiers. For related information see also 76 Solid-State Physics.

20020060122 NASA Marshall Space Flight Center, Huntsville, AL USA
Laser Image Contrast Enhancement System
Kurtz, Robert L., Inventor, NASA Marshall Space Flight Center, USA; Holmes, Richard R., Inventor, NASA Marshall Space Flight Center, USA; Witherow, William K., Inventor, NASA Marshall Space Flight Center, USA; Apr. 02, 2002; 8p; In English
Patent Info.: Filed 12 Feb. 2001; NASA-Case-MFS-31561-1; US-Patent-6,366,403; US-Patent-Appl-SN-782460; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

An optical image enhancement system provides improved image contrast in imaging of a target in high temperature surroundings such as a furnace. The optical system includes a source of vertically polarized light such as laser and a beam splitter for receiving the light and directing the light toward the target. A retardation plate is affixed to a target-facing surface of the beam splitter and a vertical polarizer is disposed along a common optical path with the beam splitter between the retardation plate and the target. A horizontal polarizer disposed in the common optical path, receives light passing through a surface of the beam splitter opposed to the target-facing surface. An image detector is disposed at one end of the optical path. A band pass filter having a band pass filter characteristic matching the frequency of the vertically polarized light source is disposed in the path between the

horizontal polarizer and the image detector. The use of circular polarization, together with cross polarizers, enables the reflected light to be passed to the detector while blocking thermal radiation.
Official Gazette of the U.S. Patent and Trademark Office
Beam Splitters; Circular Polarization; Image Enhancement; Imaging Techniques; Laser Target Interactions



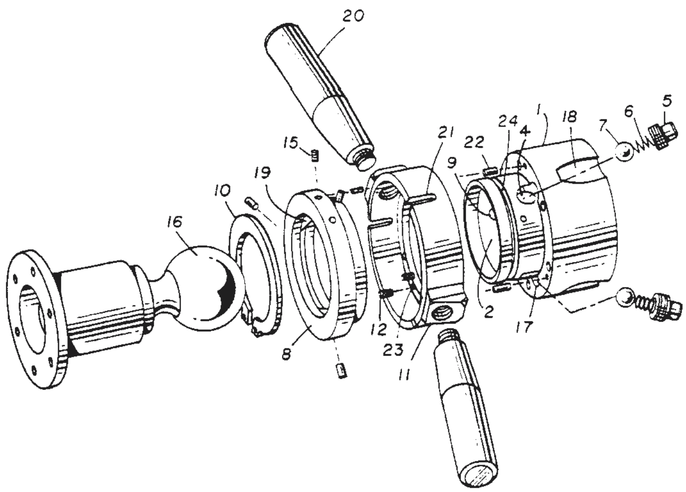
37
MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

20020004920 NASA Marshall Space Flight Center, Huntsville, AL USA
Passive Capture Joint with Three Degrees of Freedom
Cloyd, Richard A., Inventor, NASA Marshall Space Flight Center, USA; Weddendorf, Bruce, Inventor, NASA Marshall Space Flight Center, USA; Feb. 13, 2001; 6p; In English
Patent Info.: Filed 7 Dec. 1998; NASA-Case-MFS-31146-1; US-Patent-6,186,693; US-Patent-Appl-SN-206146; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

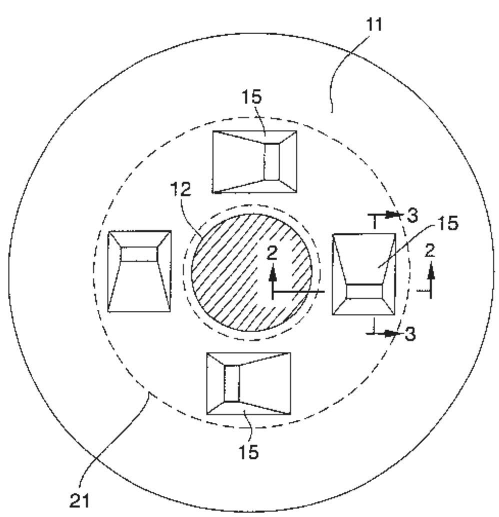
A passive capture joint with three degrees of freedom is presented wherein two structural elements are joined together solely by moving the two elements into position, and which when joined together have rotation in all three axes. The inventive apparatus is comprised of two halves: (1) a joint ball mounted on a stem as in a common trailer hitch, and; (2) a socket. The socket consists of a base having an exterior wall and forming an interior chamber, the chamber having a top end and a bottom end, and an interior wall. The chamber is open at the top end, and forms a spherical cup at the bottom end. The socket base's interior chamber is sized to accept the joint ball. The base also forms at least one bore at an acute angle away from the interior chamber's open end. The bores have a first opening in the interior wall of the chamber, and a second opening in the exterior wall of the base. Retaining balls sized to fit within the bores, but to only partially pass through the first opening, are moveably housed within the bores. The retaining balls are moveably held in the first opening by a compression spring housed in the bore. As the joint ball is inserted in the chamber it forces the retaining balls back into the bore until the equator of the joint ball passes. Because the bore is at an acute angle to the chamber the joint ball cannot exit the chamber without the joint being unlocked. The joint is unlocked by rotating a locking ring which encircles the base and covers the second opening. The locking ring has a radial slot for each retaining ball,

disposed angularly from the base, and sized to allow passage of the retaining ball in the radial direction when the locking ring is rotated to align the radial slot with the second opening.
Official Gazette of the U.S. Patent and Trademark Office
Cavities; Joints (Junctions); Balls



20020005124 NASA Marshall Space Flight Center, Huntsville, AL USA
Load Transfer Mechanism for a Turbine Disk
Effinger, Michael R., Inventor, NASA Marshall Space Flight Center, USA; Dec. 19, 2000; 6p; In English
Patent Info.: Filed 12 Nov. 1998; NASA-Case-MFS-31270-1; US-Patent-6,162,019; US-Patent-Appl-SN-190784; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A load transferring system wherein a composite turbine disk mounted on a shaft is in contact with a backup disk which is secured to the shaft. The turbine disk is made of layers of woven carbon fibers held in a rigid configuration in a ceramic matrix. The composite disk has a plurality of lugs which have trapezoidal cross sections when cut by planes which are perpendicular to each other, with both planes being normal to the disk. The backup disk is provided with recesses which are the negative of the trapezoidal lugs to lock the two disks together. A second backup disk may be secured to the shaft to secure the composite turbine disk between the backup disks.
Official Gazette of the U.S. Patent and Trademark Office
Loads (Forces); Turbines; Disks (Shapes)



20020005132 NASA Marshall Space Flight Center, Huntsville, AL USA

Gasket Assembly for Sealing Mating Surfaces

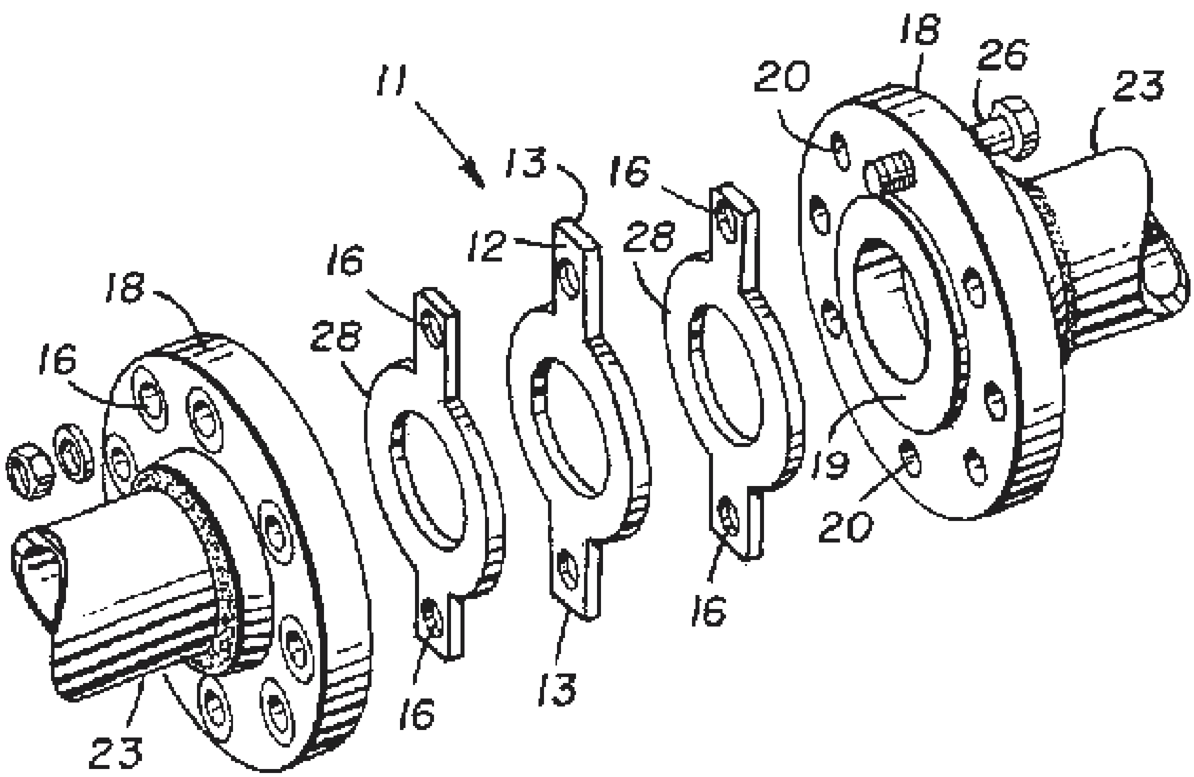
Bryant, Melvin A., III, Inventor, NASA Marshall Space Flight Center, USA; Nov. 07, 2000; 6p; In English

Patent Info.: Filed 21 Sep. 1998; NASA-Case-MFS-31175-1; US-Patent-6,142,483; US-Patent-Appl-SN-160205; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A gasket assembly for securing a pair of surface together wherein an electrically conductive gasket base having a central opening is provided with a pair of layers secured to opposite sides of the gasket base, with the layers being a fusible alloy, a brazing alloy or a synthetic, thermoplastic material which will melt, without degrading, when the gasket base is heated. The surfaces may be secured to each other by a plurality of bolts to squeeze the gasket assembly there between or by some other clamping means. An electrical current is passed through the gasket base to heat it to a temperature sufficient to melt the layers to seal the surfaces to opposite sides of the gasket base.

Official Gazette of the U.S. Patent and Trademark Office

Bonding; Gaskets; Sealing



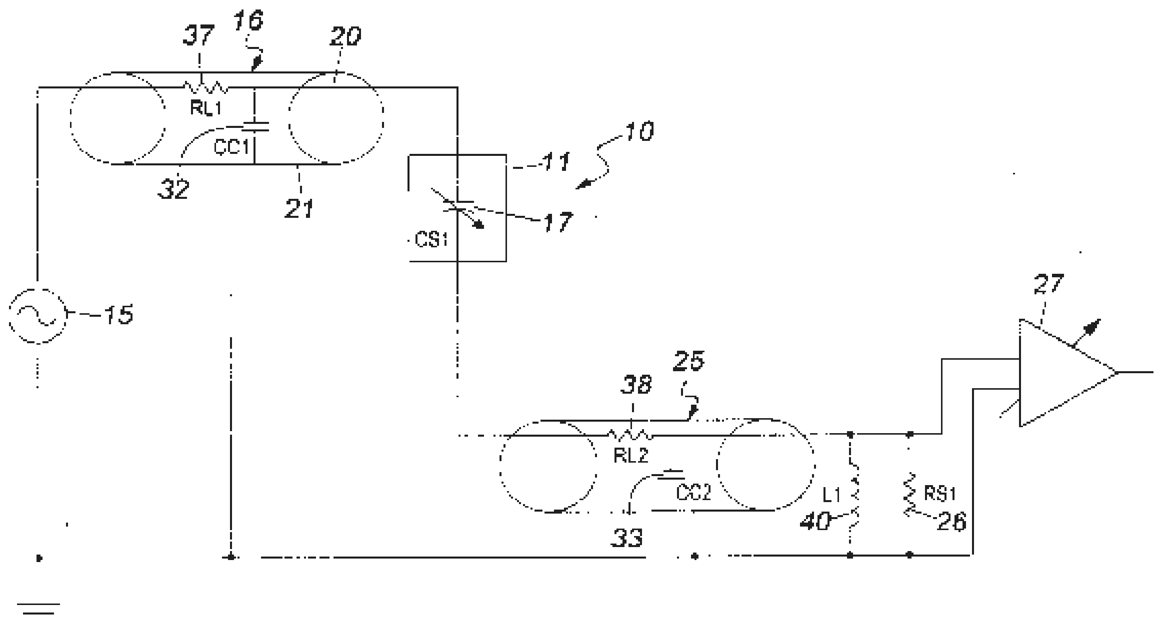
20020010899 NASA Marshall Space Flight Center, Huntsville, AL USA

System for Measuring Capacitance

McNichol, Randal S., Inventor, NASA Marshall Space Flight Center, USA; May 08, 2001; 4p; In English

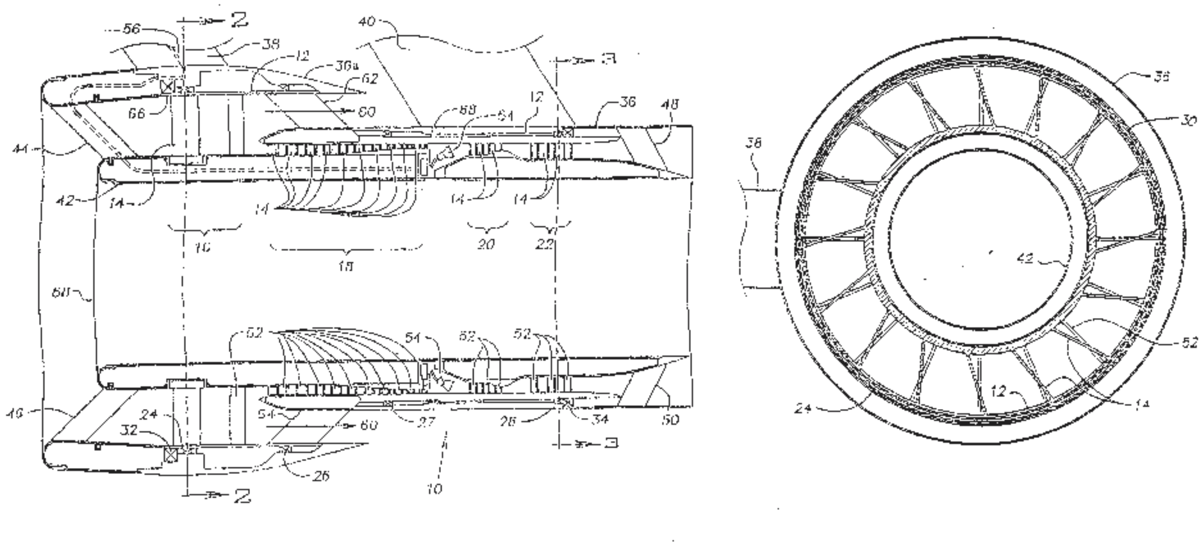
Patent Info.: Filed 21 Sep. 1998; NASA-Case-MFS-31195-1; US-Patent-6,227,046; US-Patent-Appl-SN-162483; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A system has been developed for detecting the level of a liquid in a tank wherein a capacitor positioned in the tank has spaced plates which are positioned such that the dielectric between the plates will be either air or the liquid, depending on the depth of the liquid in the tank. An oscillator supplies a sine wave current to the capacitor and a coaxial cable connects the capacitor to a measuring circuit outside the tank. If the cable is very long or the capacitance to be measured is low, the capacitance inherent in the coaxial cable will prevent an accurate reading. to avoid this problem, an inductor is connected across the cable to form with the capacitance of the cable a parallel resonant circuit. The impedance of the parallel resonant circuit is infinite, so that attenuation of the measurement signal by the stray cable capacitance is avoided.
Official Gazette of the U.S. Patent and Trademark Office
Capacitance; Circuits; Detection; Liquid Levels



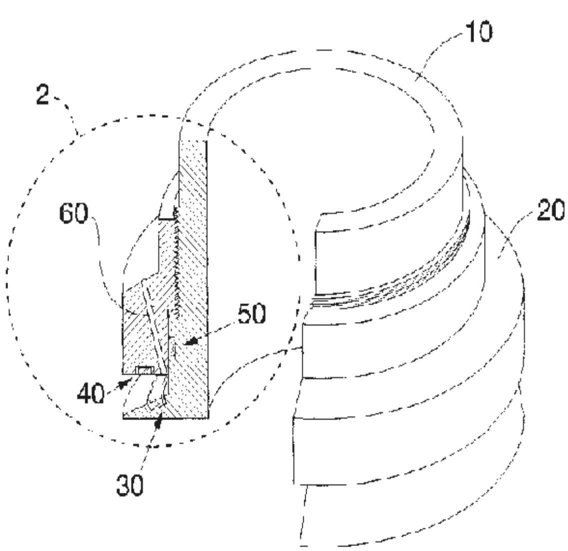
20020060089 NASA Glenn Research Center, Cleveland, OH USA
Exoskeletal Engine
Chamis, Christos C., Inventor, NASA Glenn Research Center, USA; Blankson, Isaiah M., Inventor, NASA Glenn Research Center, USA; Richter, William A., Inventor, NASA Glenn Research Center, USA; May 28, 2002; 8p; In English
Patent Info.: Filed 17 Nov. 2000; NASA-Case-LEW-16790-1; US-Patent-6,393,831; US-Patent-Appl-SN-722194; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche
A turbojet engine is made from a drum-like portion having a circular blade section extending inwardly therefrom, a support member, and a bearing arranged around a circle having a diameter substantially equal to or greater than the diameter of the blade

section. The drum-like portion is rotatably mounted within the support member on the bearing. Instead of a turbine spinning on a shaft, a turbine spinning within a drum is employed.
Official Gazette of the U.S. Patent and Trademark Office
Turbojet Engines; Turbine Blades; Engine Design



20020060121 NASA Marshall Space Flight Center, Huntsville, AL USA
Attachment Fitting for Pressure Vessel
Smeltzer, Stanley S., III, Inventor, NASA Marshall Space Flight Center, USA; Carrigan, Robert W., Inventor, NASA Marshall Space Flight Center, USA; Apr. 09, 2002; 6p; In English
Patent Info.: Filed 22 Jun. 1999; NASA-Case-MFS-31066; US-Patent-6,367,844; US-Patent-Appl-SN-338407; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This invention provides sealed access to the interior of a pressure vessel and consists of a tube. a collar, redundant seals, and a port. The port allows the seals to be pressurized and seated before the pressure vessel becomes pressurized.
Official Gazette of the U.S. Patent and Trademark Office
Pressure Vessels; Seals (Stoppers); Sealing



20020060126 NASA Johnson Space Center, Houston, TX USA

Androgynous, Reconfigurable Closed Loop Feedback Controlled Low Impact Docking System With Load Sensing Electromagnetic Capture Ring

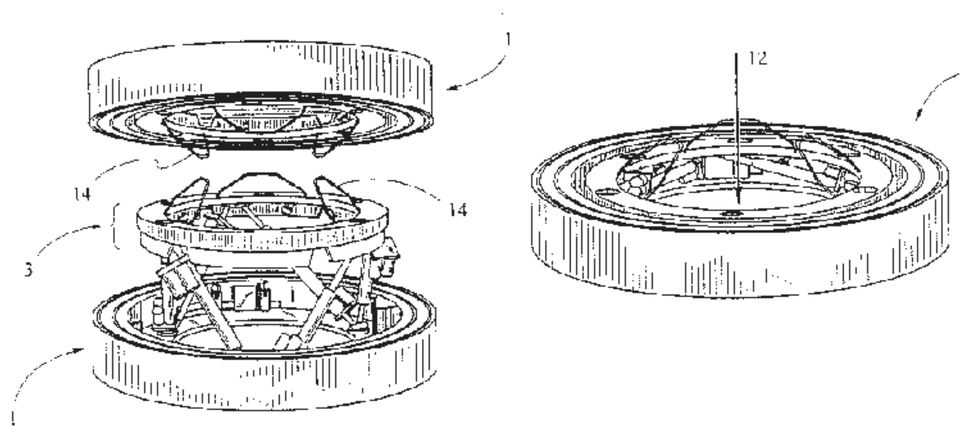
Lewis, James L., Inventor, NASA Johnson Space Center, USA; Carroll, Monty B., Inventor, NASA Johnson Space Center, USA; Morales, Ray H., Inventor, NASA Johnson Space Center, USA; Le, Thang D., Inventor, NASA Johnson Space Center, USA; Mar. 12, 2002; 28p; In English; Provisional US-Patent-Appl-SN-104843, filed 29 Sep. 1998

Patent Info.: Filed 20 Sep. 1999; NASA-MSC-22931-1; US-Patent-6,354,540; US-Patent-Appl-SN-405301; US-Patent- Appl-SN-104843; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The present invention relates to a fully androgynous, reconfigurable closed loop feedback controlled low impact docking system with load sensing electromagnetic capture ring. The docking system of the present invention preferably comprises two Docking- assemblies, each docking assembly comprising a load sensing ring having an outer face, one of more electromagnets, one or more load cells coupled to said load sensing ring. The docking assembly further comprises a plurality of actuator arms coupled to said load sensing ring and capable of dynamically adjusting the orientation of said load sensing ring and a reconfigurable closed loop control system capable of analyzing signals originating from said plurality of load cells and of outputting real time control for each of the actuators. The docking assembly of the present invention incorporates an active load sensing system to automatically dynamically adjust the load sensing ring during capture instead of requiring significant force to push and realign the ring.

Official Gazette of the U.S. Patent and Trademark Office

Spacecraft Docking; Impact Tests; Feedback Control; Electromagnets



44
ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 28 Propellants and Fuels.

20020060117 NASA Pasadena Office, CA USA

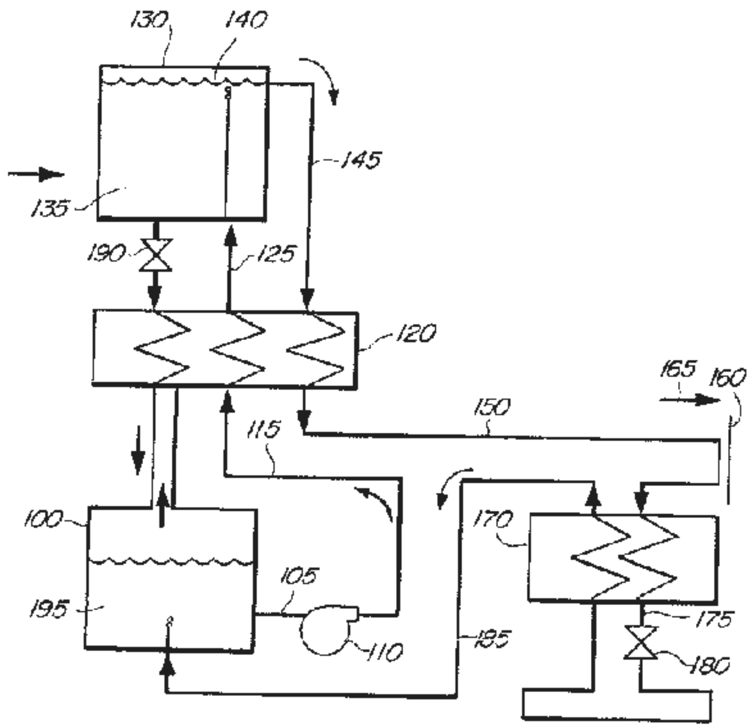
Carbon Dioxide Absorption Heat Pump

Jones, Jack A., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Apr. 23, 2002; 4p; In English

Patent Info.: Filed 9 May 2001; NASA-Case-NPO-19855; US-Patent-6,374,630; US-Patent-Appl-SN-853931; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A carbon dioxide absorption heat pump cycle is disclosed using a high pressure stage and a super-critical cooling stage to provide a non-toxic system. Using carbon dioxide gas as the working fluid in the system, the present invention desorbs the CO2 from an absorbent and cools the gas in the super-critical state to deliver heat thereby. The cooled CO2 gas is then expanded thereby

providing cooling and is returned to an absorber for further cycling. Strategic use of heat exchangers can increase the efficiency and performance of the system.
Official Gazette of the U.S. Patent and Trademark Office
Carbon Dioxide; Cooling Systems; Absorption Cooling; Heat Pumps



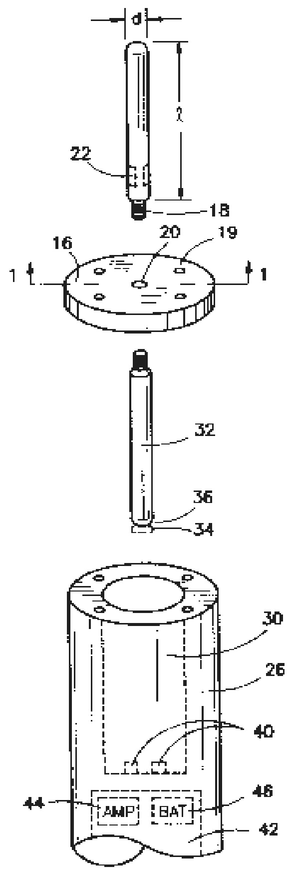
47
METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

20020060108 NASA Kennedy Space Center, Cocoa Beach, FL USA
Extreme Wind Velocity Measurement System
Zysko, Jan A., Inventor, NASA Kennedy Space Center, USA; Starr, Stanley O., Inventor, NASA Kennedy Space Center, USA; Apr. 16, 2002; 10p; In English
Patent Info.: Filed 14 Sep. 1999; NASA-Case-KSC-11886; US-Patent-6,370,949; US-Patent-Appl-SN-408654; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A wind velocity measurement system employs two different principles of physics to measure wind speed: (1) the aerodynamic force imparted to a low profile, rigidly mounted cylindrical rod, and (2) the vibrating frequency of the rod as vortices are shed from the rod's cylindrical surface. A set of strain gages is used as a common sensor for both measurements, and these provide force measurements imparted by the wind on the rod. The signals generated by the strain gages are fed to processing circuitry that calculates the wind speed and direction from the signals. The force measurement is proportional to the square of the wind speed. Since it is a vector quantity, it can also be used to derive wind direction. The vortex shedding frequency is a scalar quantity and is linearly proportional to wind speed. This frequency can be calculated by analyzing the force measurements generated by the

strain gages over time. Both of the wind velocity calculations can be advantageously used by the processing circuitry to generate an accurate wind velocity reading.
Official Gazette of the U.S. Patent and Trademark Office
Strain Gages; Wind Velocity Measurement; Flow Direction Indicators



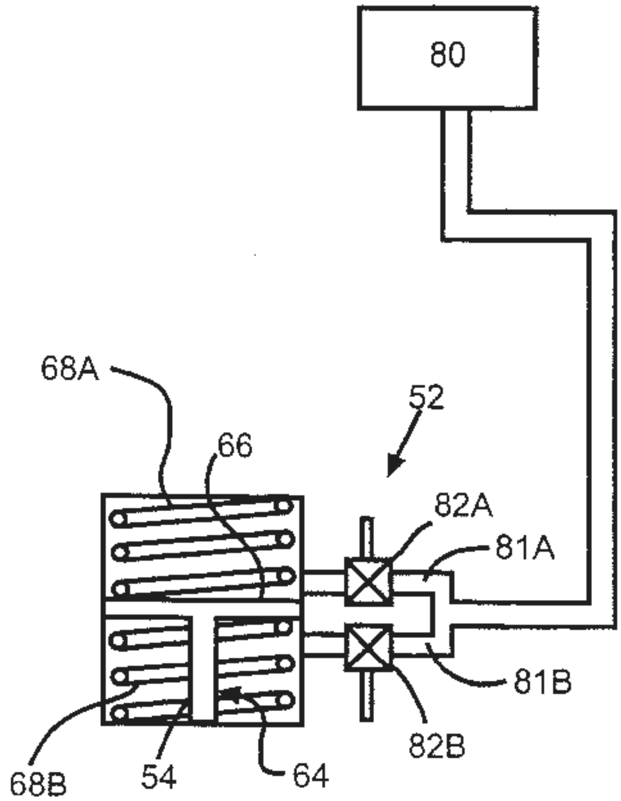
61
COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM.

20020060133 NASA Glenn Research Center, Cleveland, OH USA
Shape Memory Alloy Actuator
Baumbick, Robert J., Inventor, NASA Glenn Research Center, USA; Apr. 09, 2002; 18p; In English; Division of US-Patent-Appl-SN-286877, filed 6 Apr. 1999
Patent Info.: Filed 1 Sep. 2000; NASA-Case-LEW-16685-2; US-Patent-6,367,250; US-Patent-Appl-SN-660124; US-Patent-Appl-SN-286877; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The present invention discloses and teaches a unique, remote optically controlled micro actuator particularly suitable for aerospace vehicle applications wherein hot gas, or in the alternative optical energy, is employed as the medium by which shape

memory alloy elements are activated. In gas turbine powered aircraft the source of the hot gas may be the turbine engine compressor or turbine sections.
Official Gazette of the U.S. Patent and Trademark Office
Actuators; Computer Storage Devices; Inventions; Shape Memory Alloys



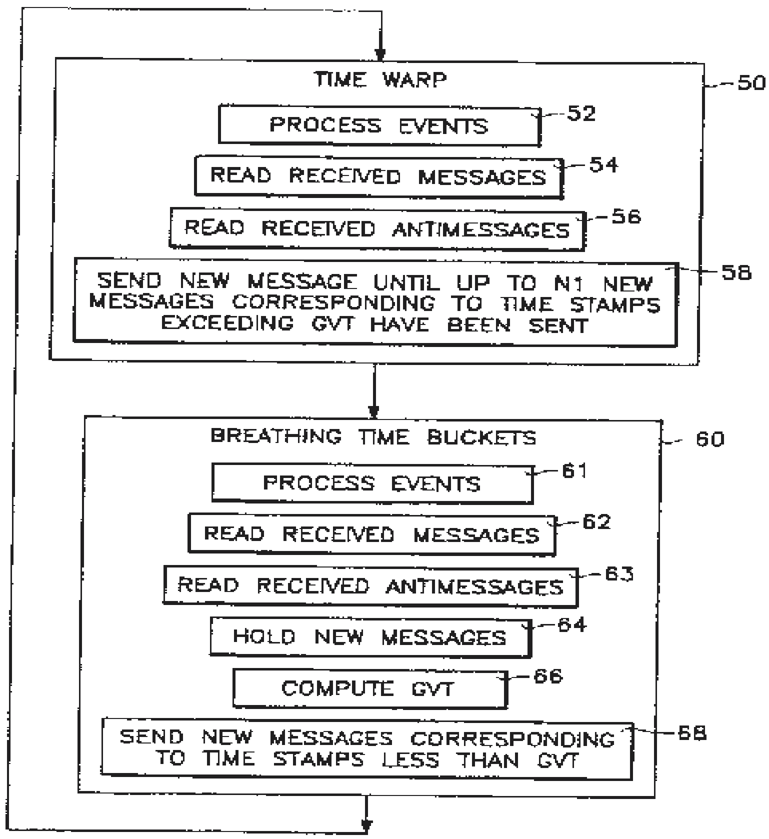
62
COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

20020034986 NASA Pasadena Office, CA USA
Synchronous Parallel System for Emulation and Discrete Event Simulation
Steinman, Jeffrey S., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Nov. 27, 2001; 30p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-246372, filed 13 May 1994, which is a continuation-in-part US-Patent-Appl-SN-880211, filed 21 Jan. 1992
Patent Info.: Filed 9 Jun. 1998; NASA-Case-NPO-18414-4; US-Patent-6,324,495; US-Patent-Appl-SN-094386; US-Patent-Appl-SN-246372; US-Patent-Appl-SN-880211; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A synchronous parallel system for emulation and discrete event simulation having parallel nodes responds to received messages at each node by generating event objects having individual time stamps, stores only the changes to the state variables of the simulation object attributable to the event object and produces corresponding messages. The system refrains from transmitting the messages and changing the state variables while it determines whether the changes are superseded, and then stores the unchanged state variables in the event object for later restoral to the simulation object if called for. This determination preferably includes sensing the time stamp of each new event object and determining which new event object has the earliest time stamp as the local event horizon, determining the earliest local event horizon of the nodes as the global event horizon, and ignoring

events whose time stamps are less than the global event horizon. Host processing between the system and external terminals enables such a terminal to query, monitor, command or participate with a simulation object during the simulation process.
Official Gazette of the U.S. Patent and Trademark Office
Parallel Processing (Computers); Events; Computerized Simulation



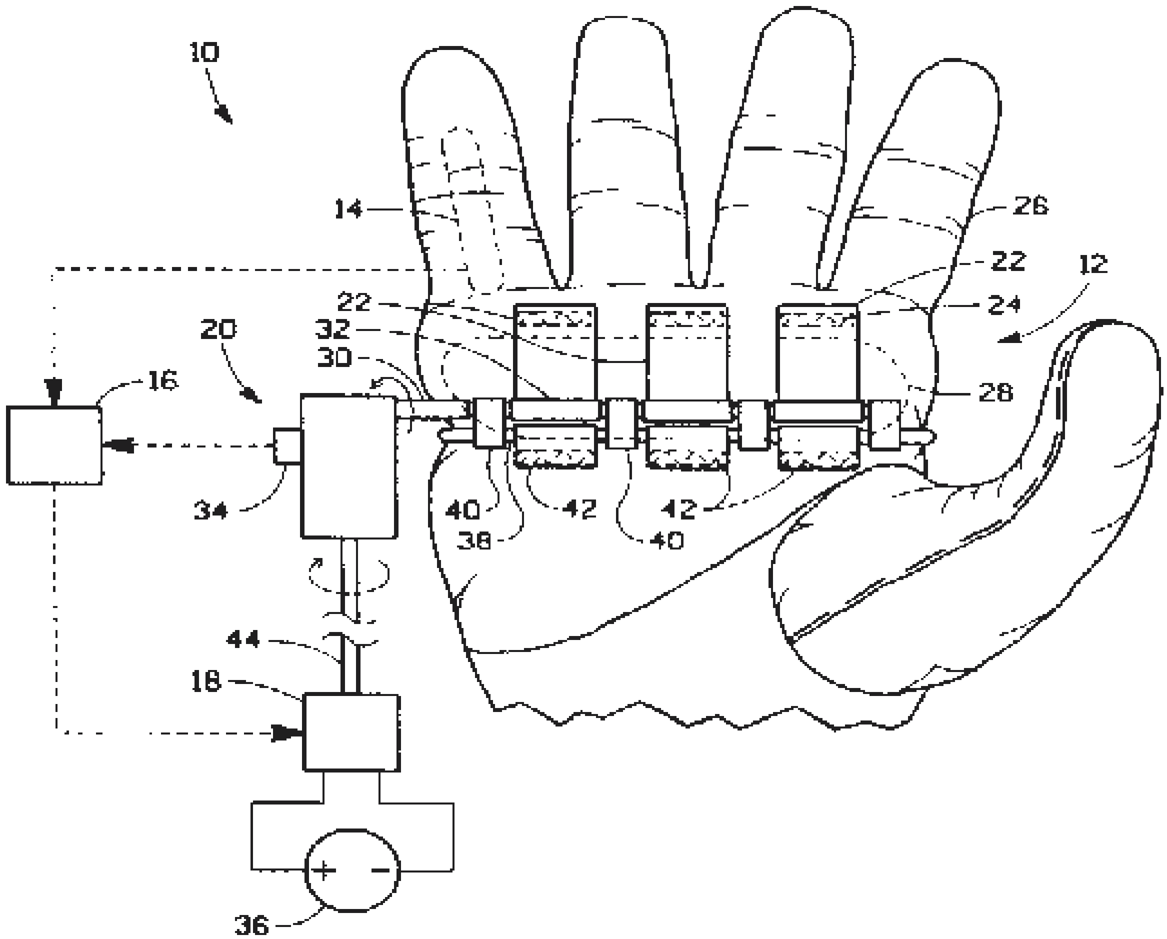
63
CYBERNETICS

Includes feedback and control theory, artificial intelligence, robotics and expert systems. For related information see also 54 Man/System Technology and Life Support., Artificial Intelligence and Robotics

20020034861 NASA Johnson Space Center, Houston, TX USA
Actuator for Flexing a Resilient Covering
Cencer, Daniel George, Inventor, NASA Johnson Space Center, USA; Nov. 06, 2001; 22p; In English
Patent Info.: Filed 26 Dec. 1996; NASA-Case-MSC-22797-1; US-Patent-6,312,398; US-Patent-Appl-SN-786842; No Copyright ; Avail: CASI; A03, Hardcopy; A01, Microfiche

The present invention provides a power assisted actuator assembly for flexing restraints in response to movement of an underlying member or a controller. The actuator assembly generally includes a flexible member, such as a cord or fabric panel, having a first end coupled to the restraint and a second end coupled to a drive member, such as a drive roller or winch. The drive

member, which may be located remotely or locally, pulls on the flexible member to flex the restraint. The actuator assemblies are useful in many applications, including space suit gloves and compliant robot arms.
Official Gazette of the U.S. Patent and Trademark Office
Actuators; Coverings; Flexing



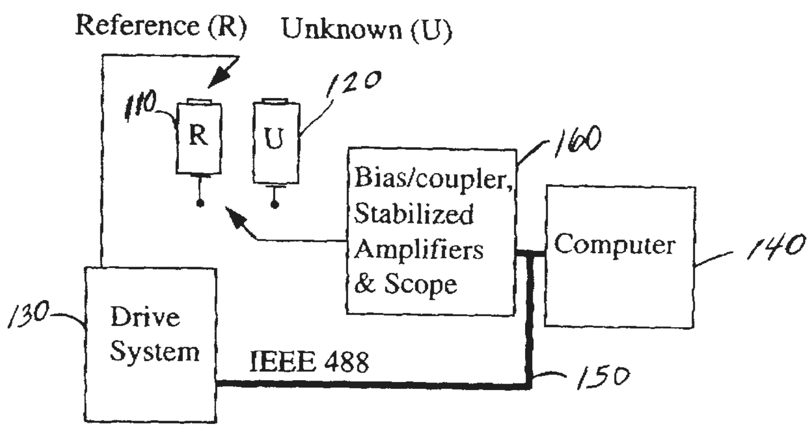
71
ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see 45 Environmental Pollution.

20020034971 NASA Langley Research Center, Hampton, VA USA
Non-Destructive Evaluation Method and Apparatus for Measuring Acoustic Material Nonlinearity
Yost, William T., Inventor, NASA Langley Research Center, USA; Cantrell, John H., Inventor, NASA Langley Research Center, USA; Feb. 05, 2002; 8p; In English; Provisional of US-Patent-Appl-SN-143841, filed 15 Jul. 1999
Patent Info.: Filed 14 Jun. 2000; NASA-Case-LAR-15926-1; US-Patent-6,343,513; US-Patent-Appl-SN-616346; US-Patent-Appl-SN-143841; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

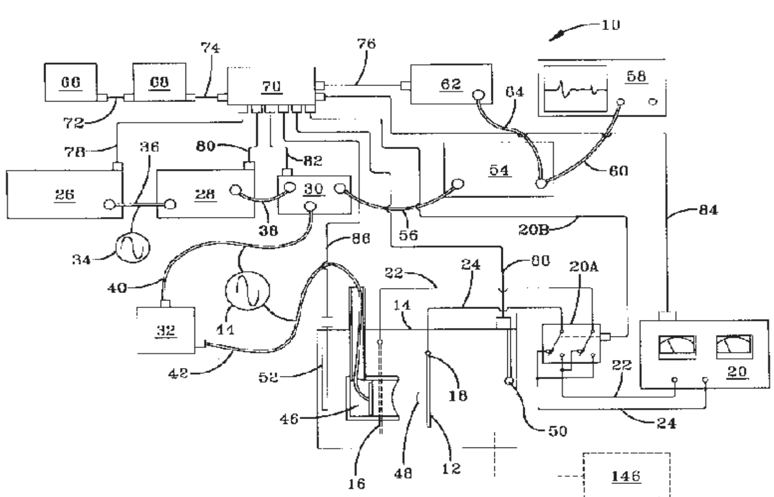
An acoustic non-linearity parameter (beta) measurement method and system for Non-Destructive Evaluation (NDE) of materials and structural members obviates the need for electronic calibration of the measuring equipment. Unlike known

substitutional measuring techniques requiring elaborate calibration procedures, the electrical outputs of the capacitive detector of a sample with known beta and the test sample of unknown beta are compared to determine the unknown beta. In order to provide the necessary stability of the present-inventive reference-based approach, the bandpass filters of the measurement system are maintained in a temperature-controlled environment, and the line voltage supplied to said amplifiers is well-regulated.
Official Gazette of the U.S. Patent and Trademark Office
Acoustic Properties; Nondestructive Tests; Nonlinearity; Equipment



20020060109 NASA Glenn Research Center, Cleveland, OH USA
Plating Processes Utilizing High Intensity Acoustic Beams
Oeftering, Richard C., Inventor, NASA Glenn Research Center, USA; Denofrio, Charles, Inventor, NASA Glenn Research Center, USA; Apr. 09, 2002; 28p; In English
Patent Info.: Filed 19 Sep. 2000; NASA-Case-LEW-17041-1; US-Patent-6,368,482; US-Patent-Appl-SN-669052; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A system and a method for selective plating processes are disclosed which use directed beams of high intensity acoustic waves to create non-linear effects that alter and improve the plating process. The directed beams are focused on the surface of an object, which in one embodiment is immersed in a plating solution, and in another embodiment is suspended above a plating solution. The plating processes provide precise control of the thickness of the layers of the plating, while at the same time, in at least some incidents, eliminates the need for masking.
Official Gazette of the U.S. Patent and Trademark Office
Beams (Radiation); Plating; Sound Waves



Includes light phenomena; and optical devices. For lasers see 36 Lasers and Masers.

20020005091 NASA Goddard Space Flight Center, Greenbelt, MD USA

Fiber Grating Coupled Light Source Capable of Tunable, Single Frequency Operation

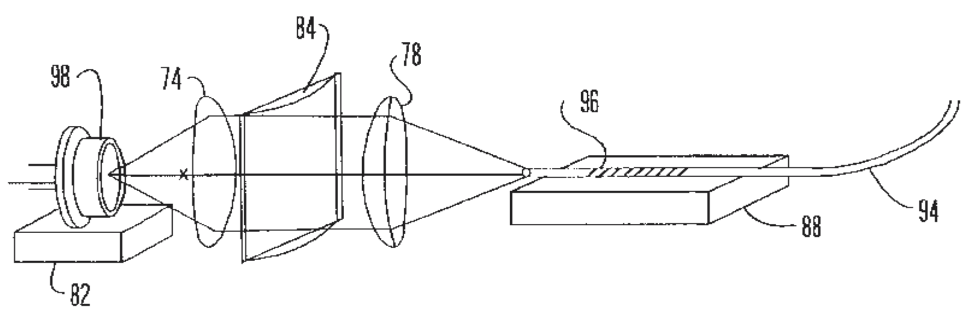
Krainak, Michael A., Inventor, NASA Goddard Space Flight Center, USA; Duerksen, Gary L., Inventor, NASA Goddard Space Flight Center, USA; Feb. 13, 2001; 36p; In English; Provisional US-Patent-Appl-SN-044378, filed 16 May 1997

Patent Info.: Filed 15 May 1998; US-Patent-6,188,705; US-Patent-Appl-SN-079383; US-Patent-Appl-SN-044378; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Fiber Bragg grating coupled light sources can achieve tunable single-frequency (single axial and lateral spatial mode) operation by correcting for a quadratic phase variation in the lateral dimension using an aperture stop. The output of a quasi-monochromatic light source such as a Fabry Perot laser diode is astigmatic. As a consequence of the astigmatism, coupling geometries that accommodate the transverse numerical aperture of the laser are defocused in the lateral dimension, even for apsherical optics. The mismatch produces the quadratic phase variation in the feedback along the lateral axis at the facet of the laser that excites lateral modes of higher order than the TM(sub 00). Because the instability entails excitation of higher order lateral submodes, single frequency operation also is accomplished by using fiber Bragg gratings whose bandwidth is narrower than the submode spacing. This technique is particularly pertinent to the use of lensed fiber gratings in lieu of discrete coupling optics. Stable device operation requires overall phase match between the fed-back signal and the laser output. The fiber Bragg grating acts as a phase-preserving mirror when the Bragg condition is met precisely. The phase-match condition is maintained throughout the fiber tuning range by matching the Fabry-Perot axial mode wavelength to the passband center wavelength of the Bragg grating.

Official Gazette of the U.S. Patent and Trademark Office

Bragg Gratings; Light Sources; Frequencies; Tunable Lasers; Semiconductor Lasers



20020060107 NASA Langley Research Center, Hampton, VA USA

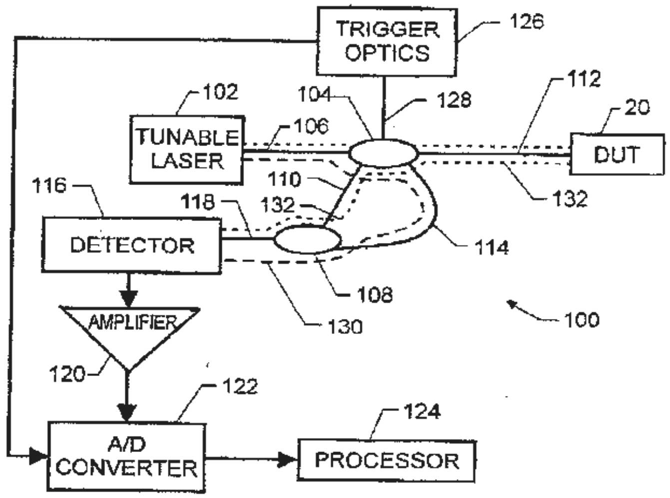
System and Method for Measuring the Transfer Function of a Guided Wave Device

Froggatt, Mark E., Inventor, NASA Langley Research Center, USA; Erdogan, Turan, Inventor, NASA Langley Research Center, USA; Apr. 23, 2002; 12p; In English; Provisional US-Patent-Appl-SN-153873, filed 14 Sep. 1999

Patent Info.: Filed 15 Jun. 2000; NASA-Case-LAR-15954-1; US-Patent-6,376,830; US-Patent-Appl-SN-606120; US-Patent-Appl-SN-153873; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

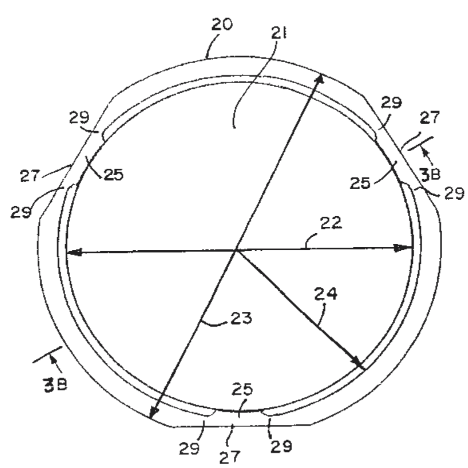
A method/system are provided for measuring the NxN scalar transfer function elements for an N-port guided wave device. Optical energy of a selected wavelength is generated at a source and directed along N reference optical paths having N reference path lengths. Each reference optical path terminates in one of N detectors such that N reference signals are produced at the N detectors. The reference signals are indicative of amplitude, phase and frequency of the optical energy carried along the N reference optical paths. The optical energy from the source is also directed to the N-ports of the guided wave device and then on to each of the N detectors such that N measurement optical paths are defined between the source and each of the N detectors. A portion of the optical energy is modified in terms of at least one of the amplitude and phase to produce N modified signals at each of the N detectors. At each of the N detectors, each of the N modified signals is combined with a corresponding one of the N reference signals to produce corresponding N combined signals at each of the N detectors. A total of N(sup 2) measurement signals are generated by the N detectors. Each of the N(sup 2) measurement signals is sampled at a wave number increment (Delta)k so that N(sup 2) sampled signals are produced. The NxN transfer function elements are generated using the N(sup 2) sampled signals.

Reference and measurement path length constraints are defined such that the N combined signals at each of the N detectors are spatially separated from one another in the time domain.
Official Gazette of the U.S. Patent and Trademark Office
Scalars; Optical Waveguides; Optical Transfer Function



20020060124 NASA Pasadena Office, CA USA
Flexure-Ring for Centering a Concave Lens in a Bore of a Housing for an Optical System
Ford, Virginia G., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Apr. 30, 2002; 6p; In English
Patent Info.: Filed 19 Jan. 2001; NASA-Case-NPO-19518; US-Patent-6,381,081; US-Patent-Appl-SN-770798; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A flexure-ring is provided for centering a lens in a bore of a housing with 3N lens contacting stubs, where N is an integer equal to or greater than one. The stubs are formed by increasing the inside diameter of the ring made to fit tightly around a lens except at 3N locations for the aforesaid stubs, and said ring having an outside diameter made to fit tightly inside the housing bore locations. Behind each stub, a segment of the ring is removed down to a chord perpendicular to a ring diameter passing through the center of each stub. That chord is selected to have a length greater than the lens contacting surface of the stub, thereby to produce a reduced cross section of the ring on both sides of the stub to serve as flexures in relieving stresses due to different coefficients of thermal expansion of the three parts involved due to changes in temperature while in use.
Official Gazette of the U.S. Patent and Trademark Office
Cavities; Lenses; Ring Structures; Position (Location)



Subject Term Index

Personal Author Index

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The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

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PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINITRATION
14 CFR Part 1245
Patents and Other Intellectual Property Rights

AGENCY: National Aeronautics and Space Administration (NASA).

Action: Final rule.

SUMMARY: NASA is amending 14 CFR Part 1245 by removing Subpart 2, "Licensing of NASA Inventions." The Department of Commerce has issued similar regulations which prescribe the terms, conditions, and procedures upon which a federally–owned invention may be licensed. These regulations are codified at 37 CFR Part 404, *"Licensing of Government Owned Inventions."* NASA began granting licenses in accordance with the Department of Commerce regulations on March 13, 1995. All licenses agreements executed prior to this date will operate under the previous regulations.

EFFECTIVE DATE: March 13, 1995.

FOR FURTHER INFORMATION CONTACT:
John G. Mannix, (202) 358–2424.

List of Subjects in 14 CFR Part 1245
Authority delegations (Government agencies), Inventions and patents.

Under the authority, 42 U.S.C. 2473, 14 CFR Part 1245 is amended as follows:

PART 1245 — [AMENDED]

Subpart 2 — [Removed and Reserved]

In 14 CFR Part 1245, Subpart 2 (consisting of SS 1245.200 through 1245.214) is removed and reserved.

Dated: April 24,1995.

Edward A. Frankle,
General Counsel.

[FR Doc. 95 10583 Filed 4–28–95, 8:45 am]

BILLING CODE 7510 01 M

Code of Federal Regulations 37
CFR Part 404
Licensing of Government Owned Inventions

Sec.

Sec. 404.1 Scope of part.
This part prescribes the terms, conditions, and procedures upon which a federally owned invention, other than an invention in the custody of the Tennessee Valley Authority, may be licensed. It supersedes the regulations at 41 CFR Subpart 101–4.1. This part does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

Sec. 404.2 Policy and objective.
It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from federally supported research or development.

Sec. 404.3 Definitions.
(a) *'Federally owned invention'* means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) *'Federal agency'* means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a federally owned invention.

(c) *'Small business firm'* means a small business concern as defined in section 2 of Pub. L. 85–536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration.

(d) *'Practical application'* means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(e) *'United States'* means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

Sec. 404.4 Authority to grant licenses.
Federally owned inventions shall be made available for licensing as deemed appropriate in the public interest. Federal agencies having custody of federally owned inventions may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this part.

Sec. 404.5 Restrictions and conditions on all licenses granted under this part.
(a) (1) A license may be granted only if the applicant has supplied the Federal agency with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a federally owned invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) Licenses shall contain such terms and conditions as the Federal agency determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this part. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement unless sooner terminated in accordance with this part.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of the Federal agency, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The licensee may provide the license the right to grant sublicenses under the license, subject to the approval of the Federal agency. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to the Federal agency.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) Licenses may be royalty–free or for royalties or other consid–eration.

(8) Where an agreement is obtained pursuant to Sec.404.5(a) (2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of the Federal agency to terminate the license, in whole or in part, if:

(i) The Federal agency determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of the Federal agency that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) The Federal agency determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this part, upon mutual agreement of the Federal agency and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this part shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Sec. 404.6 Nonexclusive licenses.

(a) Nonexclusive licenses may be granted under federally owned inventions without publication of availability or notice of a prospective license.

(b) In addition to the provisions of Sec. 404.5, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, the Federal agency may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

Sec. 404.7 Exclusive and partially exclusive licenses.

(a) (1) Exclusive or partially exclusive domestic licenses may be granted on federally owned inventions three months after notice of the invention's availability has been announced in the Federal Register, or without such notice where the Federal agency determines that expeditious granting of such a license will best serve the interest of the Federal Government and the public; and in either situation, only if;

(i) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60–day period;

(ii) After expiration of the period in Sec. 404.7(a)(1)(i) and consideration of any written objections received during the period, the Federal agency has determined that;

(A) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilization by the public;

(B) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(C) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(D) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(iii) The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(iv) The Federal agency has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) In addition to the provisions of Sec. 404.5, the following terms and conditions apply to domestic exclusive and partially exclusive licenses;

(i) The license shall be subject to the irrevocable, royalty–free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to the Federal agency the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) (1) Exclusive or partially exclusive licenses may be granted on a federally owned invention covered by a foreign patent, patent application, or other form of protection, provided that;

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60–day period and following consideration of such objections;

(ii) The agency has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii)The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) In addition to the provisions of Sec. 404.5 the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty–free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii)The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) Federal agencies shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Sec. 404.8 Application for a license.

An application for a license should be addressed to the Federal agency having custody of the invention and shall normally include:

(a) Identification of the invention for which the license is desired including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of the representative of the applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether the applicant is a small business firm as defined in Sec.404.3(c)

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

Sec. 404.9 Notice to Attorney General.

A copy of the notice provided for in Sec. 404.7(a)(1)(i) and (b)(1)(i) will be sent to the Attorney General.

Sec. 404.10 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, the Federal agency shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license shall not be modified or terminated.

Sec. 404.11 Appeals.

In accordance with procedures prescribed by the Federal agency, the following parties may appeal to the agency head or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(a) A person whose application for a license has been denied.

(b) A licensee whose license has been modified or terminated, in whole or in part; or

(c) A person who timely filed a written objection in response to the notice required by Sec. 404.7(a)(1)(i) or Sec. 404.7(b)(1)(i) and who can demonstrate to the satisfaction of the Federal agency that such person may be damaged by the agency action.

Sec. 404.12 Protection and administration of inventions.

A Federal agency may take any suitable and necessary steps to protect and administer rights to federally owner inventions, either directly or through contract.

Sec. 404.13 Transfer of custody.

A Federal agency having custody of a federally owned invention may transfer custody and administration, in whole or in part, to another Federal agency, of the right, title, or interest in such invention.

Sec. 404.14 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to Sec. 404.8 (h) and any report required by Sec. 404.5(b)(6) may be treated by the Federal agency as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

Report Documentation Page

1. Report No. NASA/SP—2002-7039/SUPPL61	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle NASA Patent Abstracts A Continuing Bibliography (Supplement 61)		5. Report Date July 2002
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
		10. Work Unit No.
9. Performing Organization Name and Address NASA Scientific and Technical Information Program Office		11. Contract or Grant No.
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Langley Research Center Hampton, VA 23681		13. Type of Report and Period Covered Special Publication
		14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

This report lists reports, articles and other documents recently announced in the NASA STI Database.

17. Key Words (Suggested by Author(s)) Bibliographies Patent Policy NASA Programs	18. Distribution Statement Unclassified - Unlimited Subject Category - 82

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 72	22. Price A04/HC

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